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TIME TELLS

¶ Time is the ultimate test. It tells the story of the real worth of any product. ¶ Fifty years have seen the name LAYNE become a standard for pumps and well water systems the world over. The reason is the same today as it was in 1883...LAYNE means *more water...less cost...longer life.* ¶ Interesting new bulletins of special value to industries and municipalities everywhere, are yours for the asking. Address LAYNE & BOWLER, INC., DEPT. B, General Offices, Memphis, Tenn.

LAYNE PUMPS
AND WELL WATER SYSTEMS

When you write for that catalog, kindly mention THE AMERICAN CITY

Public Works and Public Credit

Public Works the Key to Prosperity and Public Security

PRONOUNCEMENTS last month by an outstanding British economist and a leading American publicist strengthened the growing conviction in both countries that a public works and housing program vast enough as to prevent unemployment at all times, is the long-sought key to prosperity and public security.

Said John A. Hobson, writing on "Recovery in Great Britain," in *The Nation* for May 23:

"The improvement that is taking place in our industries must be regarded mainly as a temporary recovery rather than a permanent cure. When a depression has gone on for several years, manufacturing and other plant is let down by insufficient expenditure upon repairs and replacement. The same applies to the more durable sorts of consumption goods, such as furniture and house repairs. But as time goes on, the need for this work of repair becomes so urgent that any reserves which lie in bank deposits waiting for investment are drawn into use for the reconditioning of industry. This is taking place in Britain at the present time on our railways and in our staple manufactures. Along with this renewal of private enterprise there is a distinct push toward large expenditure upon public projects such as slum clearance, rehousing, and the like, where a policy of strict economy was imposed when this government entered in office. Much depends upon the amount of courage with which this new policy of public works is pursued. The "public mind"—so far as such a thing exists—is well-disposed toward this more courageous policy. For the sight of several millions of workers with no work to do has become intolerable, and the obvious truth is dawning on our minds that though it will cost more to put these people to productive work than to maintain them in idleness, there are two advantages in favor of the former policy. Properly applied, such public expenditure will produce a public asset of considerable magnitude, and, secondly, it will maintain the efficiency, hope and self-respect of workers who are sinking into despondency and despair for lack of an opportunity to use their labor. There has taken place within the past few months something akin to a conversion of public opinion in favor of this positive policy."

And Walter Lippmann, lecturing on "The Method of Freedom" at Harvard University, said in concluding the series on May 18:

"As to a method of overcoming the insecurity of the proletariat, it has become necessary to recognize the right to work as a fundamental human right. The organization of this right requires the overcoming of technical, administrative and financial difficulties. But there is no reason to think they are insuperable.

"The essential principle is to have on hand at all times varied projects of useful public work on which any citizen may find employment when he needs it. The possibilities of useful public work are really inexhaustible. There is no end to what can be done in any nation to conserve its natural resources and develop them, to drain and reclaim its swamps and its deserts, to reconstruct cities and rural districts for the sake of health, beauty and convenience. The Civilian Conservation Corps and the Civil Works Administration, hastily improvised as they were, and open to many criticisms in the details of their administration, have demonstrated, I believe, that the policy is practicable and sound.

"It is not the poverty of the public treasury but poverty of the public imagination which creates the real difficulties here; that, and a misguided and oversophisticated commercialism, which identifies all productive effort with the immediate price in the market-place. I am no enemy of the price system as the main regulator of production. These lectures have been a defense of the essential principles of that system. But there is such a thing as working for future use rather than for present sales, and the public works I have in mind have this character.

"A nation cannot impoverish itself by employing its labor to improve its resources and its equipment. It is not production but idleness—it is unused materials and unused men—that are in the long run intolerably expensive."

Are Your City and County Playing Their Part?

NOTWITHSTANDING THE AMERICAN CITY'S belief in the urgent need for a new Federal appropriation of not less than two billions for public works, we are convinced also that many municipalities are failing to play their proper part in the campaign for national recovery.

Whether the present session of Congress votes adequate funds for the PWA or not, there are many efficiently managed municipalities and countries throughout the United States with ample margins of taxing or borrowing power to finance their maintenance and contruction needs without Federal aid. Failure of local officials to take a vigorous affirmative stand in this matter has resulted from the activities of shortsighted taxpayer groups who have become much more vocal than their more forward-looking fellow citizens. Unless determination to render fundamental public service overcomes the fear of criticism in such cases, public properties and real estate values will continue to deteriorate—and the restoration of property will be needlessly delayed.

A New Plan for the Collection of Real Estate Taxes

A LAW was enacted by the New York York Legislature on May 16, making possible the effectuation in that state of a new plan of collection of real estate taxes, particularly of the delinquent kind. The plan was devised by B. Orlove, a taxpayer of the city of New York, and elaborated on in its municipal finance phases by Professor Paul Studenski of New York University. It provides for the extension of loans to taxpayers, by financial institutions specially organized for that purpose. The loans would be indirectly secured by the taxpayer's debt to the city, which is a prior lien against his property ahead of the first mortgage. The charges are limited under the plan to 4 per cent interest on unpaid balances and 2 per cent to cover costs of administration and investigation and other incidental expenses. Ample safeguards are provided for the protection of the borrowing taxpayers. While the rights of mortgagees are not disturbed, substantial benefits would accrue to them.

Taxpayers will be enabled under the plan to borrow funds at low rates of interest for the immediate payment of their current or delinquent taxes and to repay the loans in easy monthly instalments. In this way the taxpayers would avoid the heavy penalties which amount in many New York State municipalities to 10 per cent or more for tax arrearages. They would also obtain relative protection against foreclosure on account of tax defaults. To the extent to which taxpayers will take advantage of the plan, municipalities will be benefited through the conversion of their frozen tax arrears into cash without any cost to them, and through the greater liquidity of their income, and consequent improvement of their credit.

A corporation has been chartered under the name Tax Discount Corporation of New York to perform the services contemplated in the plan.

For information regarding the new amendment to the Bankruptcy Act affecting municipal indebtedness, and regarding the proposed National Housing Act, see page 101 of this issue.

The Big Tank Parade

CHARLESTON, S. C.
2,000,000 Gals.

KITCHENER, ONT.
1,000,000 Gals.

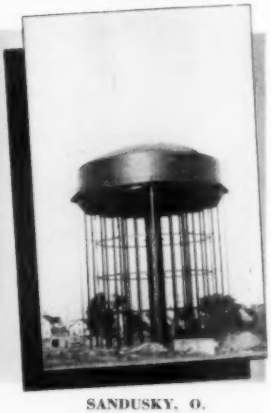
KENMORE, N. Y.
1,000,000 Gals.

DETROIT, MICH.
1,500,000 Gals.

MILWAUKEE, WIS.
1,500,000 Gals.

ROYAL OAK, MICH.
1,500,000 Gals.

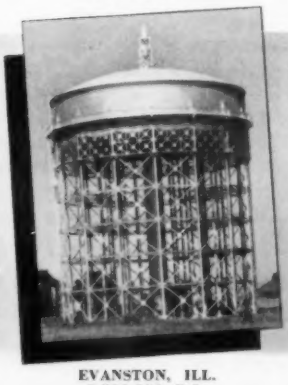
HIGH POINT, N. C.
1,000,000 Gals.



SANDUSKY, O.
1,000,000 Gals.

BROOKLYN, N. Y.
1,250,000 Gals.

INDIANAPOLIS, IND.
1,500,000 Gals.



EVANSTON, ILL.
1,500,000 Gals.

COLUMBUS, O.
2,000,000 Gals.

Big tanks are used in municipal water systems more and more all the time. The number of installations grows, as the years pass. To go back over them is like reviewing an ever-increasing column. The above illustrations show some of the typical installations we have had the pleasure of building.

CHICAGO BRIDGE & IRON WORKS

Chicago.....2127 Old Colony Bldg.	Philadelphia..1616 "1700" Walnut Street Bldg.	San Francisco.....1033 Rialto Bldg.
New York.....3308-165 Broadway Bldg.	Boston.....1501 Consolidated Gas Bldg.	Houston.....2919 Main Street
Cleveland.....2236 Rockefeller Bldg.	Birmingham.....1502 N. Fiftieth Street	Tulsa.....1625 Thompson Bldg.
Detroit.....1501 Lafayette Bldg.	Dallas.....1206 Burt Bldg.	Los Angeles.....1403 Wm. Fox Bldg.

B-386 *Fabricating plants in CHICAGO, BIRMINGHAM, and GREENVILLE, PA.*

During June we hope you will remember to mention THE AMERICAN CITY

Water Supply and Purification

Water Department Revenues Increased in 1933

WATER revenues in Cincinnati, Ohio, increased 2.2 per cent in 1933. Gross revenues totaled $2,327,646.27, and operating expenses were $1,220,417.78, leaving a gross balance of $1,107,228.49. Deducting interest and depreciation items totaling $867,615.12, the water works showed a net profit of $239,613.37 for 1933. The sums of $260,000 and $65,000 respectively, a total of $325,000, were appropriated from cash surplus for the construction of new mains and for the purchase of a new centralized operations building. This financing eliminated a bond issue, with a resultant saving in interest.

During the period of the bank holiday, March, 1933, checks on all banks were accepted in payment of water bills and were retained until the banks reopened. Checks returned on closed banks were held for a limited period to enable consumers to repay the Department. Not one cent was lost, and invaluable goodwill was gained by this procedure.

The only inconvenience to the Water Works Department because of the spring flood was in the transportation of employees to and from the California works while the roads were under water.

A continuous program of replacement and improvement was carried on in 1933. New nickel iron plungers were placed on the four River Station raw water pumps, the original plungers having been badly scored by muddy river water during their 25 years of service. A new 48-inch pump main was installed from the Main Station, known as No. 3 main. The No. 1 man, installed in 1907, was replaced with steel from Eastern Avenue to Columbia Avenue, and the No. 2 main was relaid and anchored from the Pennsylvania Railroad to Columbia Avenue. All three mains are cross-connected and valved, so that a loop with segregated feeders is now available some distance from the station.

The operating expenditures for the Commercial Division were reduced from $255,000 in 1930 to $126,500 in 1933.

C. A. DYKSTRA,
City Manager.

Electrolysis Zones Marked on City Map

THE Electrolysis Division of the Department of Water and Power of Los Angeles has plotted thousands of individual 24-hour electrolysis tests from the field on a large map of the city. From information shown on this map, engineers can make scientific application of remedial measures to reduce electrolysis hazards to a minimum. The map is valuable also in selecting routes for new mains, especially trunk lines, since it shows the regions of least electrolysis hazard. Where such districts cannot be avoided, the hazards can be measured accurately and proper allowance made in the engineering design of the line.

According to a report of this work, the map "shows the electric potential relation of the water (and gas) pipe system to the track system of the electric street railways. In the actual map the locations where the substructures are negative to the tracks (the negative zones) are shown in blue, and locations where the sub-structures are positive to the tracks (the positive and more hazardous zones) are shown in red. The areas so outlined constitute a series of potential gradient curves in which the tracks are the abscissas showing distance, and the ordinates perpendicular thereto show the relative potentials according to the scale used."

These data are made available to other public utilities and substructure-owning companies and are useful to them in determining the mutual effects between their systems and the Department's piping system. The map reveals any existing weakness in the railway electrical systems and at the same time makes apparent the means to correct such weakness. Concrete evidence of this nature quickly secures cooperation of the railway companies, since the correction of such conditions improves the companies' operating and power distributing efficiency.

The map was prepared by M. Van Giesen aided by N. J. Smith, who was in charge of the field work, and his assistant, Robert Ashline. Most of the office work was handled by W. E. Kirkendall.

Proof That Meters Pay

A CIRCULAR about twice the size of the illustration below has been distributed quite generally by plumbers in New York City and shows very effectively the fact that with the increase of 50 per cent in the flat rates for water in New York City which became effective January 1, 1934, the householder would be better off if he installed a water meter on his service. Note the sentence immediately below the table: "The cost of a suitable meter and its installation is so modest that no property owner can really afford to put the matter off much longer."

THE RATES FOR WATER SUPPLIED TO PROPERTY OWNERS IN THE CITY OF NEW YORK WERE INCREASED 50% ON JANUARY 1ST, 1934.

The question arises, what can they do about it?

There is something very definite they can do, and by doing it they will actually save money. This is to install a Water Meter, which at their request is permissible in the city ordinance, and hereafter pay for the water consumed on a meter rate basis.

Where a landlord at the present time pays his bill in advance for the year, this is not necessary due to the fact that once a meter is installed he pays on a quarterly basis only for what is consumed.

Where the owner of the premises has already paid his water bill for the year, upon the installation of a meter the city automatically credits his account so that he pays for no water until the total amount which he has already paid for is consumed on the meter rate basis.

FOR HOW MUCH WATER PER PERSON PER DAY
ARE YOU PAYING ON THE FLAT RATE BASIS.

To enable you to answer these questions easily and quickly, the following table has been prepared. Bear in mind that the average daily per capita consumption is less than 45 gallons.

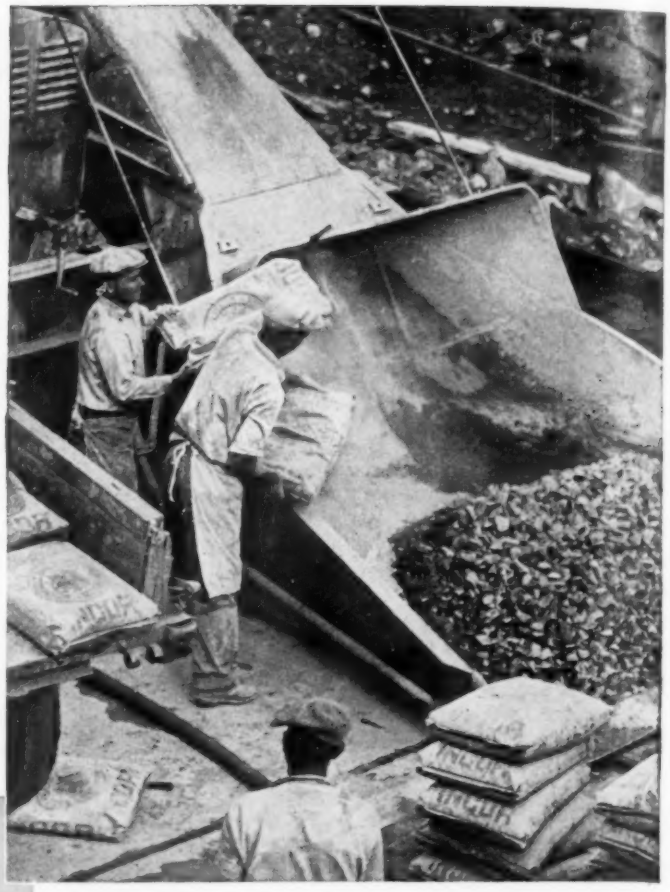
FLAT RATE		Total number of gallons allowed on a metered basis on the new rate	If metered this charge would pay for the following number of gallons per person each day in a household of							
Previous to Increase	After Increase		One	Two	Three	Four	Five	Six	Seven	Eight
$13	$19.50	97,500	267.1	133.5	89	66.7	53.4	44.5	38.1	33.4
14	21.00	105,000	287.6	144	96	72	57.5	47.9	41.1	35.9
15	22.50	112,500	308.2	154.1	102.7	77	61.6	51.4	44	38.5
16	24.00	120,000	328.7	164.3	109.6	82.2	65.7	54.8	46.9	41.1
17	25.50	127,500	349.3	174.6	116.4	87.3	69.8	58.2	49.9	43.7
18	27.00	135,000	369.8	184.9	123.2	92.4	73.9	61.6	52.8	46.2
19	28.50	142,500	390.4	195.2	130.1	97.6	78.1	65.1	55.9	48.8
20	30.00	150,000	410.9	205.4	136.9	102.7	82.2	68.5	58.7	51.4
21	31.50	157,500	431.5	215.7	143.8	107.8	86.3	71.9	61.6	53.9
22	33.00	165,000	452	226	150	113	90.4	75.3	64.6	56.5
23	34.50	172,500	472.6	236.3	157.5	118.1	94.5	78.8	67.5	59.1
24	36.00	180,000	493.1	246.5	164.3	123.2	98.6	82.2	70.4	61.6
25	37.50	187,500	513.7	256.8	171.2	128.4	102.7	85.6	73.4	64.2
26	39.00	195,000	534.2	267.1	178	133.5	106.8	89	76.3	66.8
27	40.50	202,500	554.8	277.4	184.9	138.7	111	92.5	79.2	69.3
28	42.00	210,000	575.3	287.6	191.7	143.8	115.1	95.9	82.2	71.9
29	43.50	217,500	595.8	297.9	198.6	148.9	119.2	99.3	85.1	74.5
30	45.00	225,000	616.4	308.2	205.4	154.1	123.3	102.7	88.1	77.1
31	46.50	232,500	636.9	318.4	212.3	159.2	127.4	106.1	91	79.6
32	48.00	240,000	657.5	328.7	219.2	164.3	131.5	109.6	93.9	82.2
33	49.50	247,500	678	339	226	169.5	135.6	113	96.9	84.8
34	51.00	255,000	698.9	349.4	232.9	174.7	139.8	116.5	99.8	87.4
35	52.50	262,500	719.2	359.6	239.7	179.8	143.8	119.9	102.7	89.9
36	54.00	270,000	739.7	369.8	246.5	184.9	147.9	123.3	105.7	92.5
37	55.50	277,500	760.2	380.1	253.4	190	152	126.7	108.6	95
38	57.00	285,000	780.8	390.4	260.2	195.2	156.1	130.1	111.5	97.6
39	58.50	292,500	800.1	400	266.7	200	160	133.3	114.3	100
40	60.00	300,000	821.9	410.9	273.9	205.4	164.4	137	117.4	102.7
41	61.50	307,500	842.4	421.2	280.8	210.6	168.5	140.4	120.3	105.3
42	63.00	315,000	863	431.5	287.6	215.7	172.5	143.8	123.3	107.9
43	64.50	322,500	883.5	441.7	294.5	220.8	176.7	147.2	126.2	110.4
44	66.00	330,000	904.2	452.1	301.4	226.5	180.8	150.7	129.2	113
45	67.50	337,500	924.6	462.3	308.2	231.1	184.9	154.1	132.1	115.6
46	69.00	345,000	945.2	472.6	315	236.3	189	157.5	135	118.1
47	70.50	352,500	965.7	482.8	321.9	241.4	193.1	160.9	137.9	120.7
48	72.00	360,000	986.3	493.1	328.8	246.5	197.2	164.4	140.9	123.3
49	73.50	367,500	1006.8	503.3	335.6	251.7	201.4	167.8	143.8	125.9
50	75.00	375,000	1027.3	513.6	342.3	256.8	205.4	171.2	146.8	128.4

The cost of a suitable meter and its installation is so modest that no property owner can really afford to put the matter off much longer.

Compiled by Neptune Meter Co.

TIME
—the unseen Ingredient

While concrete hardens, traffic is detoured, merchants lose sales —How 24-Hour Cement prevents these losses



NO LOST SALES HERE. Canal Street, New Orleans, commercial hub of the far South, had to be repaved. Merchants demanded quick action so 'Incor' 24-Hour Cement was used. Eighteen blocks were paved, a section at a time. New concrete, placed one day, was in use the next. Traffic was not diverted, business was unaffected. Merchants estimate this saved $5,000,000 sales loss.

Concrete poured today, ready for traffic tomorrow

Concrete's unseen ingredient is Time—the time consumed in hardening—once 28 days, then 14, now 10. But even ten days is much too long when you consider what this delay means. When traffic is diverted, business withers, merchants lose sales that never return. Motorists travel needless extra miles over dusty detours.

Now this problem is solved by a cement called 'Incor' which hardens *seven times as fast* as ordinary Portland cement. With 'Incor' 24-Hour Cement, the mixer pours concrete today—tomorrow you drive over it. In concrete buildings, column forms are stripped first morning after concreting, floor forms that afternoon; one form-set does the work of several, reducing form and handling costs; financing expense reduced, revenue from investment begins sooner. Result, a new era in concrete construction.

And 'Incor' makes better concrete because it is a perfected Portland cement. Its price is now little more than ordinary cement—a fraction of resulting economies. 'Incor'* is made by the producers of Lone Star Cement—subsidiaries of International Cement Corporation, New York, and is sold by other leading cement manufacturers.

* Reg. U. S. Pat. Off.

'INCOR' 24-Hour Cement

Highways — Asphalt Plants — Snow Removal

Justifying Snow-Removal Costs on California Highways

THERE are 3,300 miles of state highways in California on which an annual battle is fought between state highway maintenance forces and repeated snowstorms. Scattered throughout the state there are 170 snow-plows of all types, held in readiness for the attacks. According to an article by T. H. Dennis, State Maintenance Engineer, in the monthly publication of the State Department of Public Works of California, this battle cost $312,000 last year, and a similar amount will be required this year. The question arises: Can this expenditure be justified? It requires approximately 17.5 cents from the gas tax return made by each of the 1,800,000 motor vehicles in California.

Snow is removed on 29 state highway routes, which serve in the aggregate some 11,226 vehicles daily during the winter months. Assuming that each machine traveled only 150 miles and made 14.5 miles to the gallon of gasoline—averages determined in the joint survey conducted by the United States Bureau of Public Roads and the Division of Highways, then the daily return from the gas tax would be $3,486, or $313,740 for a conservative winter season of three months' duration.

Apparently, therefore, the motorists enjoying the service on these particular routes pay their way. Furthermore, if these roads were closed for a three months' period, the interest loss at 4 per cent on some 3,000 miles of road, conservatively estimated to cost $15,000 per mile, would amount to $450,000. Considered from this angle, also, it would appear advisable to keep these routes open.

Consider the situation from the standpoint of business. The State Chamber of Commerce of California is authority for the statement that some $1,500,000 was expended by motorists during the 1931-32 season for transportation alone to winter sports areas, and that this same expenditure for last year was nearer $2,000,000. The expenditures for snow sports wearing apparel and equipment, together with the sums spent for meals and lodgings, might conservatively equal, if not exceed, this cost of transportation.

Through Routes Include City Streets

THE tourist and the traveling salesman have long been provoked by a highway that leads *to* a city but leaves one to blunder around through twisted and unnamed streets to find his way through this uncharted maze to another highway some three to ten miles away.

Of what use is it for a state to build a fine four-lane road to the city limits to connect with a city street paved 50 feet wide, with a double line of street-railway tracks down the middle of it and an intermittent but more or less continuous line of parked cars down each side of it? It means a *four-lane* road connecting with a *two-lane street* just where the traffic begins to double in numbers. Even if the street be paved 60 feet wide, with car tracks and parking it means but one 14-foot way on each side of the car tracks, with that 14-foot way frequently stopped by cars turning out of or into the parking strip.

Through highways should meet *through streets* in cities. Not necessarily *straight streets*, but so chosen as to lead the traveler rather directly through the city without having to encounter the jams of the business centers.

The city should not only mark the way *through*, but also should mark *all* streets with names prominently displayed, not down on the walks or hidden on the curbs.

Streets that are to carry state highways should, as far as possible, be free from car lines. *Stop lights* and all traffic signals should be perfectly clear and *prominently* located for quick and easy sight by the motorist. Above *all* keep the system *uniform throughout* the city.

—From remarks of Prof. F. H. Eno, Ohio State University, at the 25th anniversary celebration of the Ohio Good Roads Federation.

Municipal Asphalt Plants

IN Report No. 82 issued in February, 1934, by the American Municipal Association, Chicago, Ill., there are interesting data on municipal asphalt paving plants. The report states that Chicago maintains three plants and in 1933 made $2,840,782.95 worth of paving repairs by city forces. Cincinnati and San Francisco have municipal plants, and Portland, Ore., has a plant which handles repairs to hard-surface streets which are under city maintenance, repairs to cuts made by utility companies and plumbers, special paving jobs, miscellaneous services to private concerns, and new street improvement contracts secured by bidding in open competition with private contractors.

Grand Rapids, Mich., has a small asphalt plant for repair work; Atlanta, Ga., has a plant which it has not operated since 1932; Trenton, N. J., has a plant which it uses for repairs only; Dayton, Ohio, uses its plant for maintenance and not for new construction; Spokane, Wash., operates its plant on a revolving fund basis; and Miami, Fla., has a small experimental plant which it reports was used in 1932-33 for resurfacing 46,700 square yards of streets at a cost of $2.95 per ton compared with a cost of $16.65 per ton for material if bought in the open market.

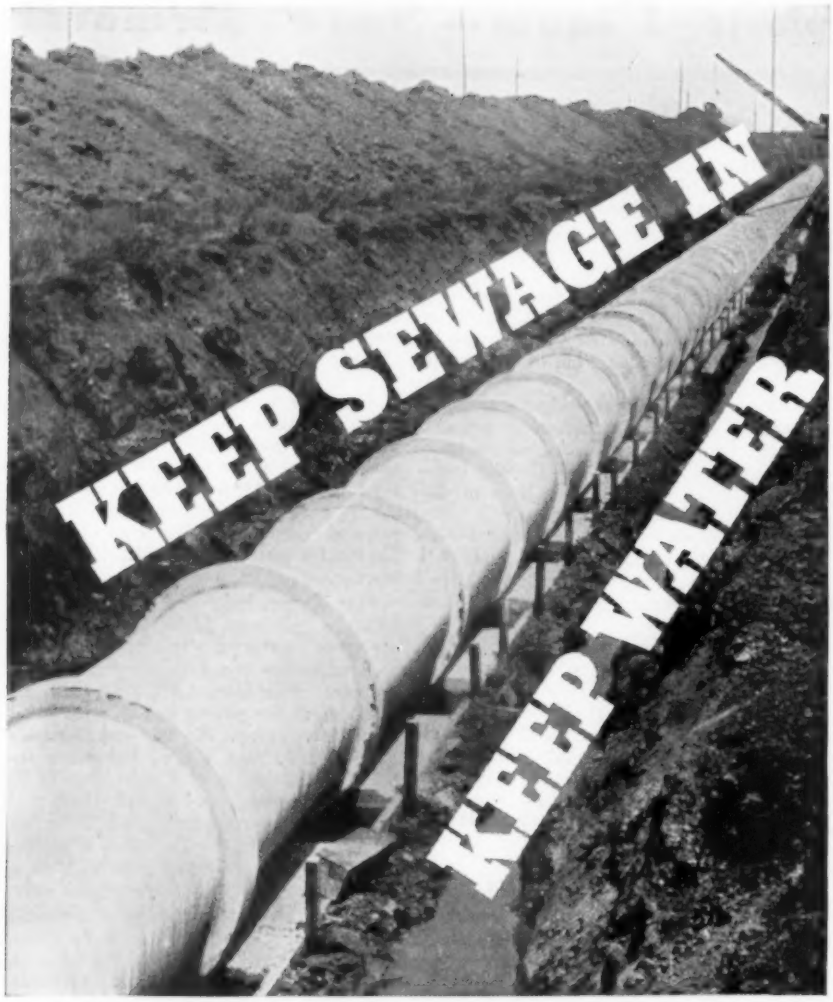
Fort Wayne, Ind., used its plant during 1933 to produce 2,590,761 pounds of asphaltic mixtures. The plant is operated in connection with the testing laboratory. Pasadena, Calif., uses its asphalt plant for paving streets with oiled macadam. Troy, N. Y., and Niagara Falls, N. Y., own plants, the latter reporting that its street repairs cost 47.78 cents per square yard 1 inch thick and 95.56 cents per square yard 2 inches thick. Asheville, N. C., has a small asphalt plant, and Lincoln, Nebr., has a small unit which it uses for repairs only.

Waco, Texas, has a surface treament plant which it uses for squeegee or Wardimite paving. Lansing and Kalamazoo, Mich., have asphalt plants, as do Hamilton, Ohio, and Pueblo, Colo. Wichita, Kans., has a small maintenance plant.

The complete report from which this material is taken may be secured from the American Municipal Association (Drexel Avenue and 58th Street, Chicago, Ill.) for 25 cents.

A CATERPILLAR DIESEL FIFTY TRACTOR AND LaPLANT-CHOATE BULLDOZER WORKING ON CWA FLOOD PREVENTION PROJECT AT YORK, PA.

The tractor was used for work that could not possibly be done by hand, such as pulling large tree stumps out of the river bed and then using the bulldozer to push them into piles



Venice Sewage Force Main
Los Angeles, California

With CONCRETE PIPE SEWERS and Portland Cement Mortar Joints

Here's another concrete pipe sewer that surpassed specifications—the Venice sewage force main, built across salt marshes which had to be dyked and drained. Operating under a head of 80 feet, allowable leakage specified was 200 gallons per inch of diameter per mile per day. Actual leakage on test made with *clear* water was only 40 gallons per inch of diameter per mile per day—only 1/5 of the amount allowed.

Naturally, excessive leakage is unwanted . . . but even more serious is infiltration which means excessive handling at the disposal plant and may force the construction of a larger plant than is necessary.

Concrete Pipe Sewers with Portland Cement Mortar Joints, properly constructed, reduce leakage and infiltration to the minimum. That's one of the reasons why they're recommended by America's leading consulting engineers.

PORTLAND CEMENT ASSOCIATION
Room 236—33 West Grand Avenue • Chicago, Illinois

If you haven't a copy of the booklet, "Concrete Pipe Sewers" write for it today. It's free!

Mention THE AMERICAN CITY—it helps.

Sewerage and Sewage Disposal

PWA Sewerage Projects in Connecticut

ONE of the important parts of the Federal Administration's program for material economic recovery has been the stimulation of construction of needed public works. The installation of sewage treatment works appears to offer a fertile field of action in Connecticut, in that such works are needed in a number of locations where the discharge of untreated sewage threatens the safety of bathing and shellfish areas and causes nuisance conditions. Many installations have been held up in the past because of the expense involved but, despite the opportune offer of the Federal Government, response has been somewhat slow in Connecticut.

The largest Connecticut sewage-disposal project undertaken with Federal aid is that of the Hartford Metropolitan District. This was authorized by the voters in November, 1933, and received Federal approval. It is estimated that the cost of intercepting and collecting sewers and disposal works will amount to about $3,500,000. The town of Milford has received approval of a project for installing a new sewerage system and sewage treatment plant to afford needed sewerage facilities, and protect the Milford beaches.

The city of Danbury has received approval for a loan of approximately $200,000 to cover the cost of necessary additions to its sewage treatment plant. The borough of Wallingford is planning to construct another Imhoff tank to relieve the burden of its present treatment plant. In two other Connecticut communities, West Haven and Stamford, serious consideration is now being given to possible enlargements and alterations of existing plants. The State Department of Health has strongly recommended improvement at West Haven to protect nearby bathing beaches and avoid nuisance conditions. At Stamford, the present plant is reaching the point where it is becoming overloaded, and enlargements are needed. The Stratford disposal plant requires enlargement to care for the increased load placed upon it. A proposal for the Stratford improvement and a plan for considerable addition to the Stratford sewer collection system were approved for aid by the Federal authorities but were subsequently postponed because of local opposition to the expenditure. New Britain's sewage treatment plant badly needs replacement with modern adequate facilities, and plans for such work have been under advisement by local authorities.

Many Connecticut cities and towns have been discussing installation of facilities for treatment of present raw sewage discharge, but plans have not yet reached a definitely formulated stage. Communities such as Naugatuck and Norwich, and numerous others, fall in this category.

Additions to sewer collecting systems in the state have been undertaken with Federal aid. The city of Meriden has been in the forefront of communities undertaking such work to relieve unemployment. New Canaan has prepared plans for enlarging the collecting system. West Hartford is building a large new trunk sewer to relieve present objectionable conditions. Bridgeport is sewering a new area, and other communities might be added to this list.

—WARREN J. SCOTT, Director, Bureau of Sanitary Engineering, State Department of Health, in the *Connecticut Monthly Health Bulletin*.

Reduction of B. O. D. of Sewage by Chlorination

CHLORINATION of sewage or effluents consists of treatment with chlorine or bleaching powder, for the purposes of disinfection, retardation of decomposition, reduction of biochemical oxygen demand, control of odors or control of Psychoda, cleaning of the distribution system and destruction of surface films on trickling filters. Although chlorine may be applied for one or more of the purposes mentioned, all of them may be accomplished to some extent when sewage is chlorinated. The fact that much of the chlorine applied to sewage is used up by unstable sewage matters is reflected in a reduction in the B.O.D. of the sewage. This effect of chlorination has been studied recently by several investigators, and the available data have been reviewed by the Committee on Sewage Disposal, American Public Health Association, which came to the following conclusions:

1. Chlorination, to give residuals of 0.2 to 0.5 ppm after 10 minutes, produces a reduction in oxygen demand of 15 to 35 per cent, the reduction expressed in ppm being roughly proportional to the quantity of chlorine absorbed.

2. The evidence indicates a reduction of at least 2 ppm of oxygen demand for each ppm of chlorine absorbed, the reduction expressed in ppm being fairly constant irrespective of the number of days in the incubation period.

3. The disturbance of the normal flora and fauna in sewage effluents by the addition of chlorine leads to difficulties in the use of the B.O.D. test which will require further research before the proper interpretation can be made of some of the reported results.

4. Chlorination sufficient to produce free chlorine in a stream receiving the chlorinated sewage or effluent will retard the normal decomposition processes, thereby tending to prevent anaerobic conditions during the normally critical period of rapid oxygen depletion. Such retardation of decomposition permits opportunity for reaeration and additional dilution from tributary streams to maintain aerobic conditions.

5. In the case of a stream containing extensive sludge deposits, the effect of excess chlorine carried in a sewage effluent may be negligible in so far as the maintenance of aerobic conditions is concerned.

PWA Sewer Projects in Cincinnati

THE Division of Sewers, Cincinnati, Ohio, operated under the supervision of the Director of Public Works during 1933. About the middle of the year, the Division was requested to submit a list of sewer improvements in order that the city might participate in the Federal aid offered under the Public Works Administration of the National Industrial Recovery Act. Federal grants were applied for on 21 projects, estimated to cost $1,256,350. Fourteen contracts were awarded to December 31, 1933, of which twelve, including the three larger projects in Delhi, Sayler Park and Fernbank, are now under construction.

Later in the year the Federal Civil Works Administration of Public Works was created, and the Sewer Division submitted for consideration 48 projects. These minor projects, totaling 14,000 feet in length when completed, will eliminate all troublesome sewer conditions in the city.

The ten contract plans completed during the year 1933 totaled 34,517 feet in length. The Bloody Run sewer improvement, estimated to cost $250,000, of which $76,000 is the city's share, is being constructed under supervision of the County Sanitary Engineer.

C. A. DYKSTRA,
City Manager.

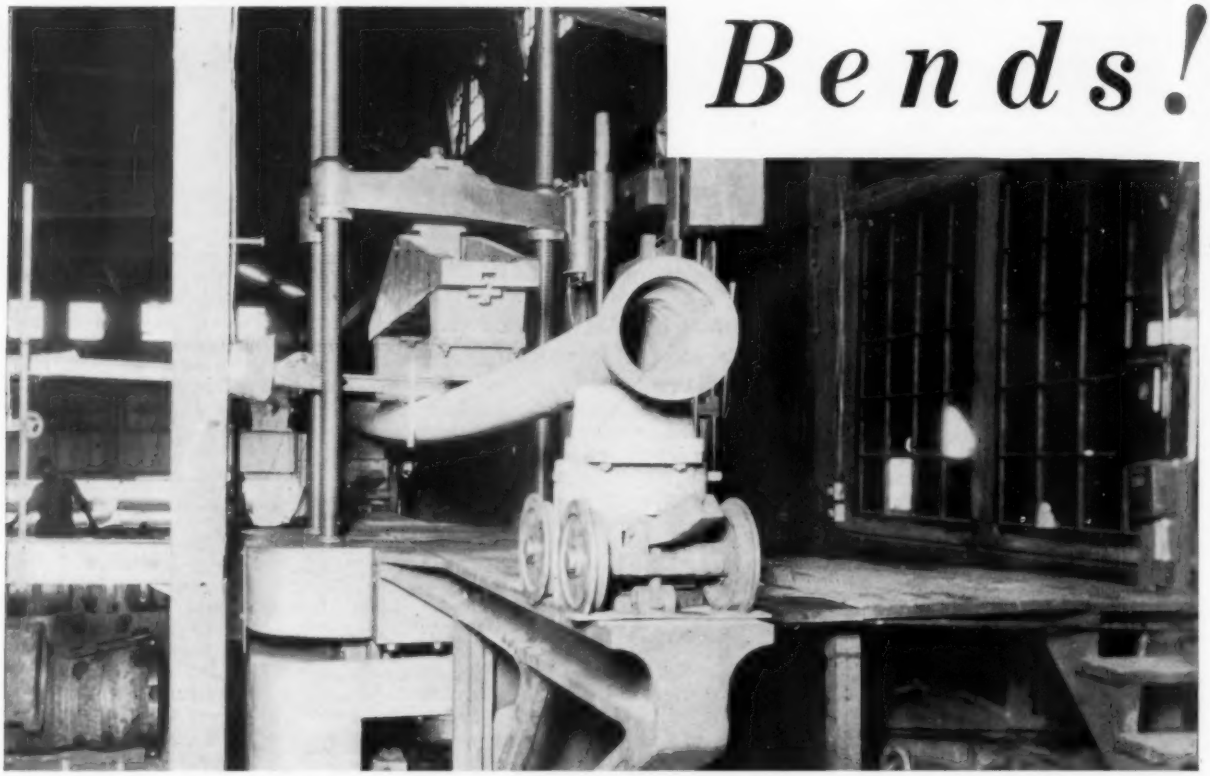
Treating Dairy Waste by the Activated Sludge Process

A SURFACE aeration activated sludge plant of the brush type is successfully treating dairy waste in Belgium. The plant, located at Hamoir, in September, 1933, was treating about 37,000 gallons of waste per day. Analyses show that the effluent compares favorably with the water of the mountain stream into which it is discharged. The cost of construction of the plant was low and it is operated by a factory laborer, who makes routine tests. The plant is designated to handle the wastes from 25,000 liters of milk daily, or a waste production of about 92,500 gallons. The sludge from the primary settling tank is mixed with the waste activated sludge and digested. The supernatant liquor of the digester is very clear, according to a paper by H. Kessener, Director, Government Institute for Waste Purification of Holland, and Willem Rudolfs, Chief, Division Water and Sewage Research, New Jersey Experiment Station, printed in full in *Sewage Works Journal*.

See Page 78 of This Issue:
"A Sewage Disposal Plant Designed for Economical Operation."

MONO-CAST PIPE

Bends!



THE accompanying photograph shows a 16-foot length of standard 4-inch Mono-Cast Centrifugal Pipe being bent in a 200,000-pound Riehle-Universal Testing Machine, which is part of the regular research testing equipment at Acipco. Ability to bend has always been one of the outstanding characteristics of Mono-Cast Pipe, due to the fact that the pipe is centrifugally cast *in sand-lined molds* and is allowed to cool slowly and naturally *in the sand-lined mold.* As a result, Mono-Cast Pipe is *inherently* at least 33 1/3 per cent more resilient than is required in U. S. Government Specifications. It weathers shocks and strains, both in handling and service. We invite inquiries for detailed data setting forth the physical properties of this pipe.

SEE OUR EXHIBIT, BOOTH 10, A. W. W. A. CONVENTION

AMERICAN CAST IRON PIPE CO.

BIRMINGHAM, ALABAMA

CHICAGO NEW YORK CITY MINNEAPOLIS SAN FRANCISCO
CLEVELAND KANSAS CITY DALLAS
LOS ANGELES SEATTLE

Refuse Removal and Destruction

Digesting Garbage with Sewage Sludge

THE laboratory studies begun several months ago at the Baltimore Sewage works on the anaerobic digestion of various mixtures of garbage and sewage sludge have been continued, and are reported in *Sewage Works Journal* by C. E. Keefer and Hermann Kratz, Jr. The results of the preliminary experiments indicated that garbage or a mixture of garbage and raw sludge would digest within 30 to 40 days when kept at a pH value of from 6.8 to 7.2 and at a temperature of 28 degrees C, and when seeded with a sufficient quantity of ripe sludge.

One of the next important steps in these investigations has been to determine the maximum quantities of garbage and raw sludge that can be digested by a given volume of ripe sludge. Laboratory experiments lasting for a period of over four months indicate that daily additions of garbage and raw sludge, having a total dry volatile solid content of 4 or even as high as 5 per cent by weight of the dry volatile solid content of the digested sludge, can be digested with the formation of an easily dewaterable end-product, which is free from odor.

The conclusions are:

1. A mixture of equal quantities of garbage and raw sludge on a volatile solids basis digests rapidly when seeded with the proper amount of digested sewage sludge and kept at 28 degrees C.

2. Daily additions of as much as 5 per cent of the initial volatile solids, consisting of 2½ per cent garbage and 2½ per cent raw sludge can be satisfactorily digested with the production of a non-offensive, easily dewaterable end-product.

3. Although daily additions of raw material greater than 5 per cent were not made, it is doubtful whether quantities much larger than this can be digested with satisfactory results.

4. The total gas and methane production was somewhat higher than was previously found. The total gas was about 750 to 800 cc and the methane 500 cc per gram of dry volatile solids added.

It is emphasized that all the experiments, including the digesting of the materials in the steel drum, were on a laboratory scale. Before any final and comprehensive conclusions can be reached regarding the practicabilty of digesting mixtures of garbage and sewage sludge in considerable quantities, a series of large-scale experiments should be conducted at several municipalities over a considerable period of time, preferably with different kinds of garbage and sewage sludge. As a result of the above studies a temporary grinding station has been erected in the eastern part of the city of Baltimore, where condemned produce or garbage can be ground and discharged into the outfall sewer, adjacent to the station. Equipment is available for the grinding of 20 tons of material an hour.

Collection Costs in 1933 Cut $100,000 Below 1929 at Schenectady

THE Bureau of Garbage and Ashes of Schenectady, N. Y., operated for 1933 at a saving of more than $100,000 over the peak year of 1929. The Bureau nevertheless was operated with no curtailment of service, dumps were maintained in a sanitary condition, and a large pond purchased several years ago by the city has been filled in to the point where it is now available for park purposes.

During the year 1933 the Bureau hauled 250,175 cubic yards of ashes and rubbish and 8,215 tons of garbage. The Bureau was also called upon to collect 265 dead dogs and 307 dead cats.

It is urged that three of the collection trucks be replaced yearly, since a number of the trucks now in use are over ten years old, are costly to maintain in operating condition and are constantly breaking down. The construction of an incinerator for the destruction of garbage and rubbish is also recommended, as is the change of name of the Bureau to the Bureau of Sanitation.—CHARLES J. LEONARD, Superintendent, Bureau of Garbage and Ashes.

Better Service at Lower Cost in Cincinnati

THE year 1933 was a most successful experience by the Waste Collection Division, Cincinnati, Ohio, from the standpoints of both service and economy. The number of complaints notably decreased as continued efforts were made to raise the standard of service. Decreases of 10 cents a cubic yard in non-combustible collection costs, 28 cents a ton in combustible collection, and 11 cents a ton in incineration, are graphic evidence of economical operation.

The following tables reveal the volume of waste collection business and the cost of carrying on the activity in the last two years.

NON-COMBUSTIBLE COLLECTION

Year	Cubic Yards	Total Labor Cost	Total Cost With Overhead And Equipment Rentals	Labor Unit Cost per Cu. Yd.	Total Cost per Cu. Yd.
1932..	273,012	$107,471.51	$188,993.23	$0.39	$0.69
1933..	302,683	103,651.02	179,386.26	.34	.59

COMBUSTIBLE COLLECTION, including Garbage Collection

Year	Tons	Total Labor Cost	Total Cost With Overhead and Equipment Rentals	Labor Unit Cost per Ton	Total Cost per Ton
1932..	86,220.2	$181,272.34	$324,515.28	$2.09	$3.76
1933..	83,132.2	171,330.79	289,251.66	2.06	3.48

During the year 1933 this Division collected and disposed of 10,704 dead dogs, 4,635 dead cats, and 299 other dead animals. Of this number, 7,673 dead dogs and 3,634 dead cats were collected from the pound of the S.P.C.A., while the remainder were collected by the watch truck on calls.

INCINERATORS

Year	Tonnage Disposed	Labor Cost	Total Cost	Labor Unit Cost per Ton	Total Unit Cost per Ton
1932..	95,536.9	$ 57,916.31	$ 89,955.48	$ .606	$ .941
1933..	95,415.1	52,601.73	79,326.81	.551	.831

The cost of incineration was decreased approximately $10,000 during 1933 as contrasted with 1932; as a result the unit cost of disposal of combustible wastes was reduced 11c a ton. The improvement and beautification of the incinerator grounds, begun in 1932, was carried on in 1933 by welfare labor.

C. A. DYKSTRA,
City Manager.

A CATERPILLAR TRACTOR WITH BULLDOZER WORKING ON THE CITY DUMP AT CAWNPORE-ON-THE-GANGES IN CENTRAL INDIA

A winch mounted on the tractor tows loaded trucks across the soft fill, and the bulldozer quickly spreads the loads

GAMEWELL SPRINKLER WATCHMAN *speaks for itself at* LYNN MASS.

July 7, 1933

The Gamewell Company
Newton Upper Falls,
Massachusetts

Gentlemen:

Referring to our master boxes, we have 23 in operation in our city; 4 in hospitals, 6 in private plants, and 13 in schools, 9 of which are operated by the Sprinkler Systems and they have given us excellent service. In 1927 we had a fire in one of our schools, which evidently started near one of our remote control stations. This station tripped the box and gave us the alarm, and the department arrived before anybody had seen the fire. Had there been a Sprinkler System in this school, the fire loss would have been much smaller.

Another fire started in a boiler room in one of our junior high schools. Sprinklers put out the fire and the department made such good time, thanks to the master box, that there was practically no water or fire loss.

A similar case took place in one of our large bakeries. The Sprinkler System tripped the box and such good time was made that there was practically no damage.

We have also had two cases of frozen pipes which the master box took care of with practically no damage.

We are pleased to recommend this type of box with the Sprinkler Watchman and Remote Control attachments.

Very truly yours,

Thomas H. Carritte

CITY ELECTRICIAN &
INSPECTOR OF WIRES

THC ER

"THANKS to the master box, there was practically no water or fire loss," says Mr. Thomas H. Carritte, City Electrician of Lynn, Mass. And, that is the same story you hear whenever a fire occurs in sprinklered property, and the sprinklers are connected *directly* with the municipal fire department through a Gamewell Master Fire Alarm Box.

This connection, known as the Gamewell "Sprinkler Watchman," should be recommended by every fire chief to the sprinklered properties in his city. When used with the Rockwood Sprinklarm it flashes an alarm to the municipal fire department quicker and more accurately than any other service available today.

THE GAMEWELL COMPANY

NEWTON, MASSACHUSETTS

Public Safety – Traffic, Fire

Important Decisions of the National Conference on Street and Highway Safety

THE Fourth National Conference on Street and Highway Safety, under the Chairmanship of Secretary of Commerce Daniel C. Roper, came to a sucessful conclusion on May 25, with addresses by Governor Joseph B. Ely, of Massachusetts, on the traffic problem from the standpoint of state control, and by Mayor B. F. Dickmann, of St. Louis, concerning the municipal aspects thereof. The attention of the Conference during its three-day session was directed primarily to improving the general traffic conditions of the country in the interest of safety, so that the annual toll of 30,000 lives and a million personal injuries could be materially reduced.

As compared with previous Conferences, this last session was marked by unanimity of opinion on most of the points which led to violent discussion ten years or more ago. It is obvious that substantial progress has been made throughout the country in the general direction of uniformity of laws and practice. But the point was emphatically stressed during the sessions that unless uniform regulations were stringently enforced, the desired reduction in accidents would not be realized. The keynote of the Conference may be said to have been emphasis on the need for more and better enforcement.

In the matter of uniform laws the outstanding development was the introduction of an act to cover financial responsibility of automobile operators, this being a feature which the previous model laws did not undertake to cover in any way. Perhaps the outstanding improvement in the Uniform Vehicle Code for the regulation of traffic on the highways is the reduction in the length of trucks or combinations of trucks and trailers, which is now set at 45 feet. In addition, maximum loads for single wheels and single axles were introduced, and while no attempt was made to set maximum gross loads for the various types of truck combinations, nevertheless a safety formula was presented to guard against loads in excess of the capacity of standard bridges.

The Conference accepted without question and approved of the new Manual on Traffic Control Devices, which was presented by a joint committee representing both the Conference and the American Association of State Highway Officials, both of which have heretofore maintained separate manuals in this field. The new Manual comprises the material heretofore contained in both of its predecessors and a considerable amount of new material covering the recent developments in the art.

Additional emphasis was given to the symbolic shape of the important signs relating to road conditions—the octagon for STOP signs; the diamond for slow type signs; the circle for railroad advance warning signs; and the square for caution signs. This emphasis is secured by requiring the outline of these signs to be indicated with reflecting buttons for night use unless the sign is otherwise illuminated. The secondary wording inside of the border is not emphasized with buttons except in the case of the word "STOP," which should be shown in red, and the letters "RR" on the railroad advance warning signs. This latter sign has also been changed by turning the cross-bars which heretofore have been vertical and horizontal, to the 45 degree angular position, so that they form a cross-buck similar to the cross-buck in the railroad crossing sign. This change has been made so that the vertical cross can be used as a symbol to represent highway intersections, and provision has been made to use such symbol to indicate the exact plan of the intersection, particularly in cases where there is some degree of angularity in the approaching roads.

The standard colors of black on a yellow background have been confirmed for all signs relating to road warnings, this being in accord with extensive tests that have recently been made by the Bureau of Public Roads in conjunction with the U. S. Bureau of Standards.

In the section relating to signals, the most important characteristic of the new Manual lies in the establishment of specific conditions which are necessary to warrant the installation or operation of a traffic control signal. These relate to vehicular and pedestrian volume, special turning movements, accident history and similar conditions, either singly or in combination. Considerable attention is also given to the use of traffic actuation in connection with signals of this type, and the principle is presented that pedestrians should be considered in many cases by the use of special signals which will indicate to them both when they should cross and when they should wait because of insufficient time to complete the crossing safely before a change of traffic flow.

The location of traffic signals has been definitely standardized on the far corner on the right-hand side of the highway, both for urban and rural locations, although in the latter case in order to secure visibility it is recommended that the signals be mounted on mast-arms over the roadway.

More definite specifications are presented for pavement and curb markings and also for both safety and traffic islands, since all of these have definite applications of use in facilitating the flow of traffic. It is believed that this uniform Manual is the most authoritative and comprehensive expression that has thus far been offered toward physical control by traffic devices.

W. B. POWELL.

Motor Vehicle Deaths

JANUARY-APRIL

1934	**9,070**
1933	**7,740**
1932	**8,452**

(National Safety Council estimates)

Cooperation Between City Planning and Fire Protection Engineers Essential

THE same factors which fire protection engineers must consider in the planning of fire protection of the city, as might be expected, are factors in determining the insurance rates of the city. These factors are measured by a definite schedule in which points of credit are given for features favorable to, and points of penalty assessed for conditions unfavorable to, fire prevention and protection. By this procedure the key rates of the city are established.

The insurance rates on individual buildings are also affected by factors which can be controlled by planning and zoning provisions. The crowding of buildings means increased insurance rates because of charges in rating schedules for the hazard of exposure. The enforcement of wise bulk zoning operates to eliminate such crowding.

It will also be found, therefore, that from the completion of certain features of the master plan which affect the local fire situation, tangible results will follow in the form of reduced fire insurance premiums, a factor which city planners will find of great assistance in support of their program.

The fire insurance bureau having jurisdiction in the municipality involved has a staff of competent fire protection engineers who are in a position to appraise the fire insurance rating value of physical features and improvements in local ordinances and fire defenses. Much of their effort, in fact, is directed to the improvement of the fire situations of cities, so that it will be apparent that city planners and fire protection engineers of rating bureaus and other organizations can be of material assistance to each other. By this cooperation, municipalities will save money not alone on insurance, but through possible reduced costs of fire-fighting facilities, and those promoting fire protection will secure the needed improvements in physical features affecting fire defenses. . . . No other two professions have a greater common interest or a more worthwhile common goal.

—From the Report of the Committee on City Planning and Zoning, National Fire Protection Association, 1931.

Park and Street Maintenance

Chicago, Ill.

This A-C Model "K" is doing its bit with a bulldozer in preparation for the second year of Chicago's World's Fair. When our photographer happened along, the South Park Commission had this Model "K" "working on the rock pile"—juggling stray pieces of breakwater into position near the south entrance to A Century of Progress. Not only the South Park Commission but all Chicago has spent a busy spring preparing for another big Fair. Dazzling lights, brightly colored buildings, expansive grounds—it's a great show, and Allis-Chalmers tractors did their part in preparing for it.

Berwyn, Ill. (at right)

There will be plenty of "garden sass" in Berwyn next summer and fall when this community garden starts yielding tasty fresh vegetables for the city's unemployed. When the time came for plowing and discing, the A-C Model "K" was called off its regular job of grading streets and operating a bulldozer on trash dumps. There is always work for an A-C tractor in any city.

Washington, Ill. (below)

By going ahead with a project to repave its main street, Washington, Ill., is cooperating with President Roosevelt in his program of recovery. This contractor's Model "K" Tractor was called on to work between the paving forms and prepare a level subgrade for the concrete.

Albany, N. Y. (at left)

Tourists sometimes ask how the City of Albany keeps its streets so clean. Perhaps this is the answer—trash and rubbish are quickly hauled away to the city dump. This picture shows an A-C Model "M" and bulldozer keeping the dump level. The 27 drawbar horsepower engine and four-speed transmission assure speedy work.

◆

For Your City . . .

WHEN you can lower the cost of doing a city job by addition of the right equipment—that is a real service to the taxpayers and the community. It has been demonstrated many times that A-C tractors and equipment can and will lower the cost of maintaining and constructing streets, hauling refuse disposal trailers, and on many other tractor jobs. It will pay your city to investigate—a check-up may result in important savings. . . . Write for the ACTION magazine.

ALLIS-CHALMERS
TRACTOR DIVISION—MILWAUKEE, U. S. A.

JUNE, 1934

Vol. XLIX, No. 6

The American City

470 Fourth Avenue
New York

35 Cents, $2 a Year

THE AMERICAN CITY advocates:

- *An abundant supply of clear, safe, palatable water*
- *Streets and roads that are well built, well lighted, well maintained*
- *Sanitary disposal of sewage and garbage*
- *Fire and police departments properly trained and equipped*
- *Traffic control for safety and facilitation; fewer grade crossings*
- *Plenty of parks, parkways, playgrounds, and swimming pools*
- *Banishment of slums, and building of well-planned home neighborhoods*
- *Administrative efficiency and citizenship co-operation in bringing these things to pass*

Installing Water Mains Under Two Railroads

Jacking Method Used for Installing Conduits Without Interrupting Railroad Traffic

By C. E. HOGEBOOM
Assistant City Engineer, Wheaton, Ill.

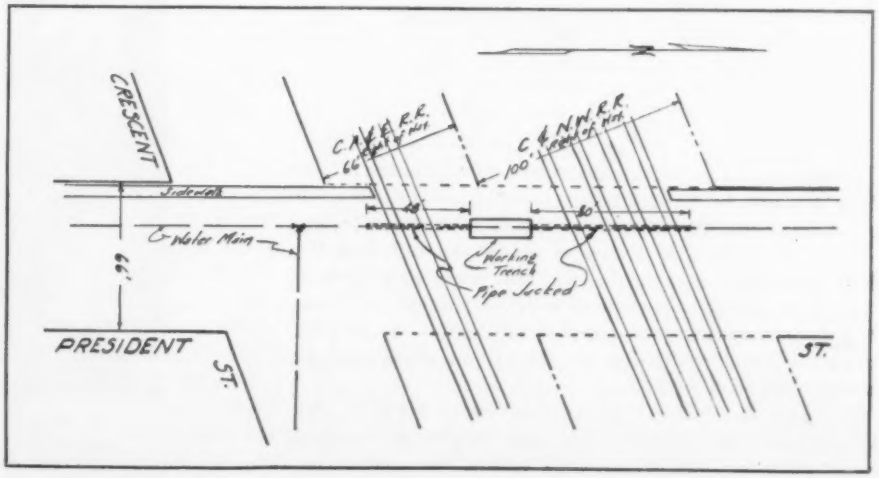
A SERIOUS leak developed in one of the water mains crossing under the main-line double track of the Chicago and Northwestern Railway from Chicago to Omaha, and the Chicago, Aurora and Elgin electric railway, in the city of Wheaton, Ill. This residential city of 8,000 population, 25 miles west of Chicago, is divided approximately in the middle by the railroads.

For water supply and fire protection the entire north side population and business district depend on five water mains under the railroads, extending from two reservoirs of 400,000 gallons capacity and an elevated tank of half that capacity.

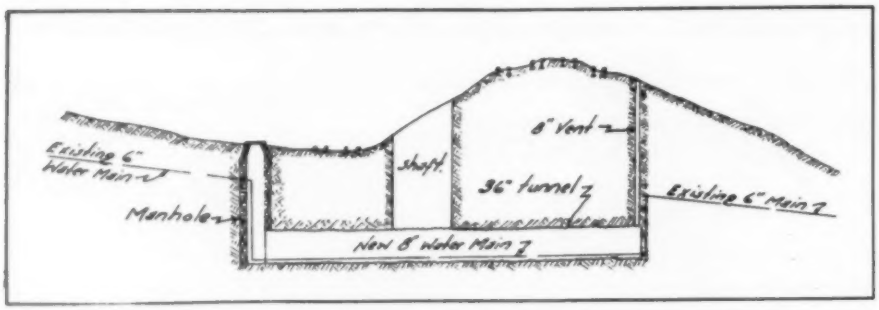
The gate valves on both sides of the tracks at this crossing were closed. Repair was essential. Tunneling appeared necessary, but expensive. Plans were presented, however, for using the Armco jacking method, a variation of the tunneling method. The decision, approved by the two railroads, was to use this method to install a 36-inch Armco corrugated iron pipe as a conduit inside which the water main would be laid. Because separation of the railroad grade through the city was a possibility at some later time, the entire crossing was placed at such a depth that it need not be disturbed in the future.

The Method Used

The working trench or shaft from which the pipe was jacked was located at the side of the street, between the tracks and was 27 feet long, 7 feet wide and an average of 13 feet deep. In the bottom of the shaft two railroad rails 18 inches apart and on a 0.5 per cent gradient, served as a guide for the pipe to be jacked. A backstop to take the back-pressure of the jacks was prepared at the



PLAN OF THE STREET AND RAILROAD TRACKS WHERE THE TUNNEL WAS PUT THROUGH



CROSS-SECTION OF THE COMPLETED TUNNEL WITH THE MAIN IN PLACE
The shaft was filled in

rear of the shaft, and the jacks were placed in position.

Next, a 16-foot length of corrugated pipe was lowered into the shaft and placed on the guide rails. One man entered the corrugated pipe, which was equipped with an electric light and an air hose for keeping the air fresh. He began excavating with short-handled tools at the front end of the pipe, placing the dirt in a cart consisting of half an oil barrel mounted on wheels, running on and between wooden rails and pulled by means of a rope at either end.

THE OUTER END OF THE 36-INCH ARMCO CORRUGATED PIPE BEING JACKED HORIZONTALLY UNDER THE TRACKS

As excavation proceeded towards the north ahead of the pipe, it was jacked forward. A total of 80 feet of pipe was placed in this way under the Northwestern tracks, additional sections of the pipe being lowered into the shaft and riveted onto the sections previously jacked. Two thicknesses of sheet metal with the corrugations running longitudinally were attached to the top of the pipe to reduce possible friction of the fill on the transverse corrugations of the pipe.

The line and grade were checked every 10 feet. No difficulty was encountered in keeping the pipe on line and grade. The soil was of a sandy nature and easy to excavate, but it was not unstable in spite of the many trains which crossed above at full speed.

Jacking the Second Line

When the 80 feet of corrugated iron pipe or conduit to the north was in place, the jacking set-up was reversed and 48 feet of pipe was jacked in the opposite direction, under the electric railroad. Here the soil was found to be a water-bearing gravel, much more unstable than the soil encountered to the north.

While a 50-ton hydraulic jack had been sufficient for the first part of the job, it now became necessary to use two jacks. When 40 of the 48 feet had been jacked, the pipe "froze" and refused to budge. By disconnecting the outer one of the two corrugated sheets or "shields" from the top of the pipe, the pressure on top of the pipe was reduced; in other words, the friction between the two sheets was much less than between the outer sheet and the gravel. It was then possible to complete the remaining 8 feet of jacking. It was necessary to work 24 hours per day while jacking through the gravel to keep the pipe moving and not let the gravel settle too tightly around the pipe and stop it.

Upon completion of the two jacking jobs, the equipment was removed from the shaft and a 24-foot length of 36-inch pipe lowered into place and connected to the adjacent ends of the jacked pipe. Backfilling the shaft was then started and the sheeting pulled.

TWO MEN OPERATING THE JACK THAT FORCED THE PIPE THROUGH THE RAILROAD EMBANKMENT

Next, a shaft was dug at each end of the new corrugated conduit to make it possible to place the water main; and also to extend the conduit an additional 6 feet at the north and 12 feet at the south in anticipation of future widening of the railway roadbed. This gave the conduit a total length of 170 feet, of which 128 feet had been jacked.

Several inches of fine sand was placed in the bottom of the corrugated conduit or tunnel to serve as a bed for the 8-inch water pipe. Planks were placed on the sand. The pipe joints were made in the shaft, and the pipe was pushed into the conduit on rollers. It was a simple matter to put on the reducers and elbows to connect the new main with the existing 6-inch main.

A manhole was built at the south end of the conduit and an 8-inch vent at the north end. This gives access to the water main in case of any trouble, and also provides sufficient ventilation.

Rate of Progress and Costs

The rate of progress achieved in jacking the 36-inch pipe through the sandy soil to the north of the shaft was 1.3 feet per hour, and through the gravel to the south was 0.8-foot per hour. This rate was computed by including the time used in the actual excavating and in the jacking process, lowering and riveting the pipe, and attaching the corrugated sheets to the top of the pipe.

Total labor costs on this job, including the laying and connecting of the new water main, building the manhole, watchman's time, etc., but not including overhead and profit, was approximately $1,800. The cost of all materials, including the corrugated pipe, lumber for the shaft, rental of jacking equipment, the water main and fittings, manhole material and sand for the conduit floor, was approximately $1,650. This we figured was a very reasonable cost for doing a job of this character.

Besides resulting in an economical installation and enabling future repairs to be made inside the tunnel or conduit, this type of installation gave other advantages, namely: no effect on the mains from traffic vibration; safety to the workmen; and freedom from slow orders on the railroad during construction.

Leaks in Other Lines

Since the installation of this tunnel, the city of Wheaton has installed three others under the railroad tracks also by the jacking method: In 1932, a leak developed in a 10-inch water main under the tracks at Cross Street. A tunnel 142 feet in length was installed, for which 102 feet of 36-inch, 8-gage Armco corrugated pipe was jacked into place, and 40 feet of lighter gage pipe laid in the shaft. In the same year a 48-foot tunnel was similarly installed under the electric railroad in relocating a 6-inch water main. In 1933, a 12-inch water main was designed as a part of a large feeder system, to pass under the two railroads at West Street. In this case 94 feet of 36-inch, 8-gage corrugated iron pipe was jacked into place and 25 feet inserted in the gap in the shaft.

All of these installations have very satisfactorily demonstrated the advantages of this method of providing crossings under railroad tracks, where the constant passage of heavy trains makes ordinary timbered tunnels impracticable.

Keeping Up Appearances

Street Cleaning an Important Factor in Impressing Visitors

By **FRANK GRASSER, Jr.**
Superintendent of Streets,
Kenosha, Wis.

THE city of Kenosha is situated on Lake Michigan about 60 miles north of Chicago. Because of its location and large manufacturing establishments, the city has become an important trade center and consequently has many visitors. A visitor's first impression is often a lasting one, and there is no doubt that the deciding factor in this impression is the condition of the streets over which he is obliged to travel. The Public Works Department of Kenosha set out to make this impression as favorable as possible in spite of the reduced budget and small working crew.

One of the first things done was to level the depressions in the streets, especially along the curb and gutter lines. After these adjustments, it was found that with the aid of two motor pick-up sweepers it was possible to sweep the 92 miles of paved streets at regular intervals and to reduce street-cleaning costs materially. In addition, the two business districts, consisting of about 12 miles, are swept regularly every morning between the hours of 5 and 7, when few cars are parked on the streets. One trucking crew disposes of the sweepings from both pick-up sweepers. In the spring and fall, however, one truck is added for a short period for special clean-up work.

Very little hand sweeping is done in Kenosha. One man is employed in the downtown district to clean the crosswalks and alleys, and one man each in the north, south and west districts attends to the crosswalks, alleys and such streets as are not accessible to the motor sweepers. One 1-ton truck and a crew gather up the piles of sweepings left by the hand sweepers.

The result of the systematic street-cleaning program is that Kenosha is kept in a sanitary and presentable condition at all times. It is impossible to over-estimate the tremendous advertising value of clean streets. Tourists spread this information wherever they travel, and local citizens become the city's most effective boosters. The city of Kenosha realizes that the civic pride of its citizens is one of its most valuable possessions, and the Public Works Department aims to keep up to their expectations at all times.

ACKNOWLEDGEMENT.—From a paper presented before the International Association of Public Works Officials.

How a Roman Highway Was Built and Used

Painstaking Research and Construction Produce Remarkable Model

A TRIP over the Appian Way, the most famous road of ancient Rome, may be experienced in mind in viewing the model of that enduring highway prepared by the U. S. Bureau of Public Roads. Methods of building the road are shown in detail, as well as authentic facts about the traffic on the highway. Extended and careful investigation by the Bureau disclosed exact information as to the design of this most famous highway in history, methods of construction, and the various types of traffic on the road.

In the foreground of the model may be seen the administrator of the work discussing ways and means for building the road shown on the plans. The other two men in the group of three are the engineer and the contractor. One of the engineer's assistants may be seen aligning, with a groma, a stake held by another assistant. Another member of the surveying party is shown running levels with a chorobates, while his assistant holds a leveling rod, for him to sight on.

The Foundation

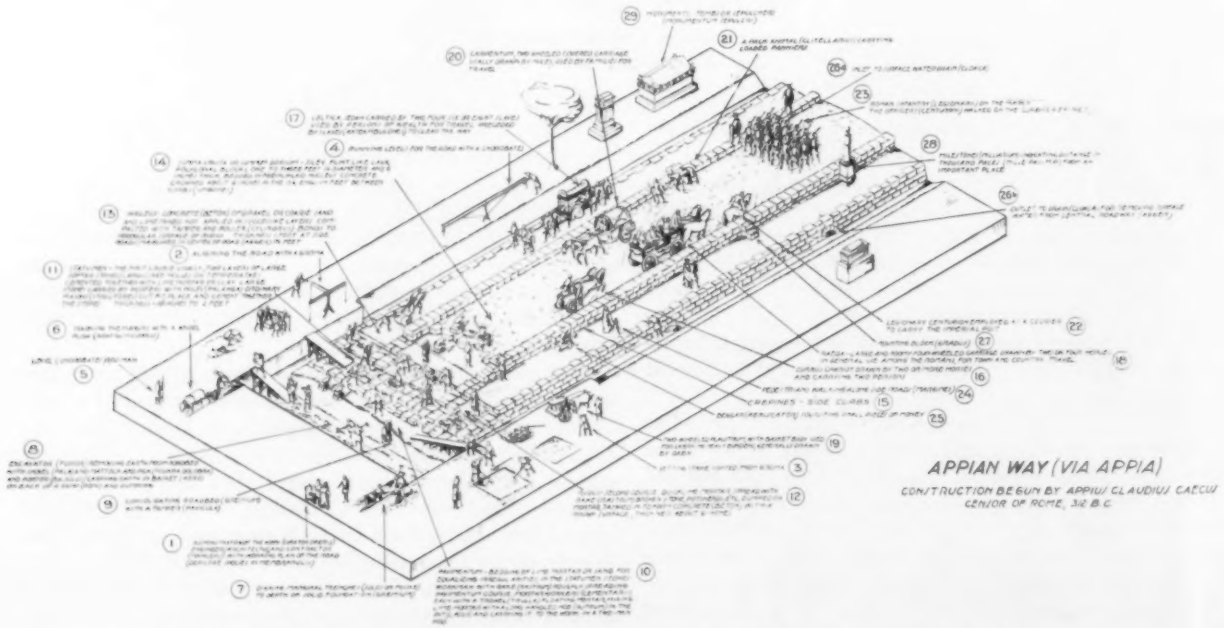
This model is designed to show a typical condition of a roadway built upon comparatively firm upland terrain. Where marshy regions or generally unstable foundations were encountered, the Roman engineers first built a framework of carpentry. The joints or sleepers were made of an oak that was not susceptible to warping or shrinkage. To protect this timber from the destructive effect of the superimposed lime mixed with other materials, they covered it with a bed of rushes or seeds, or sometimes straw. Upon this stratum of reeds or straw was laid the foundation, and the remainder of the construction proceeded in the same manner as on the firm ground, with the exception that the total thickness of masonry seems to have been reduced in order to lessen the dead load of the roadway upon the marshy subsoil.

Upon solid ground the margins of the roadway were marked by two parallel furrows of a wheel plow about 40 feet apart. Following the location of these furrows, two parallel trenches were excavated to determine the nature of the subsoil and the depth to a solid foundation. The excavator used a shovel and a mattock and pick. Then the excavators, aided by a porter with a basket upon his back, removed the earth between the trenches to the level of the roadbed. A ramp was used by the porter for reaching the elevation of the undisturbed ground surface.

Where unsuitable material was encountered, it was removed and replaced with firm subsoil, which was thoroughly compacted with a tamper. If a firm bed could not be obtained thus, wooden piles were driven into the foundation. The roadbed was then carefully shaped and leveled to receive the surfacing materials. Even where the excavation revealed a comparatively firm foundation, the subsoil was always carefully rammed before proceeding further.

The Bedding Course

Upon the roadbed, prepared as described above, there was spread a bedding course of sand from 4 to 6 inches in thickness, or mortar about one inch thick, made of lime and sand or hassock, a soft, calcareous limestone. This bedding course accommodated the irregularities in the un-



AN ISOMETRIC PROJECTION OF THE MODEL OF A SECTION OF THE APPIAN WAY PREPARED BY THE U. S. BUREAU OF PUBLIC ROADS

dressed lower side of the stones used in the first course of masonry. While spreading the bedding layer, the mortar worker sat upon a stool in order to better use his long trowel. The mortar probably had been spread first to a uniform thickness with a rake. The lime was slaked in a pit beside the road and later mixed with sand with a long-handled hoe to form the mortar. Meanwhile another pit of lime was being slaked. The mortar was carried to the road with the aid of a two-man hod. The water for slaking the lime was brought to the pits in earthenware jars carried upon the heads of the water bearers. Sometimes V-shaped wooden troughs were used to transport the water from the source of supply.

The First Course

Into the bedding course was laid the first course. This course consisted of two layers of flat stones cemented together with well-tempered lime mortar. None of the stones was permitted to be of a size smaller than would fill a man's hand, and the largest of the stones were ranged along the sides of the causeway to act in the nature of a retaining wall. Where lime mortar was not available, the stones were cemented together with clay. The first course varied in thickness from 10 inches in good ground to 2 feet in bad ground. Since the purpose of this course was to supply solidity, almost any kind of stone was used, depending upon its local availability. The softer stone was used in the first course and even in the next two courses, and the hard stone was reserved for the wearing surface.

Ordinary masons placed the stones for the first course. For cutting the stone they employed a chisel and mallet, iron wedges, the adze, and a saw. Masons also used a trowel, a mortar bucket, and a level. The heavier stones were suspended by cords from poles passed over the shoulders of the porters. For moving the heavier stones into position they used a crowbar.

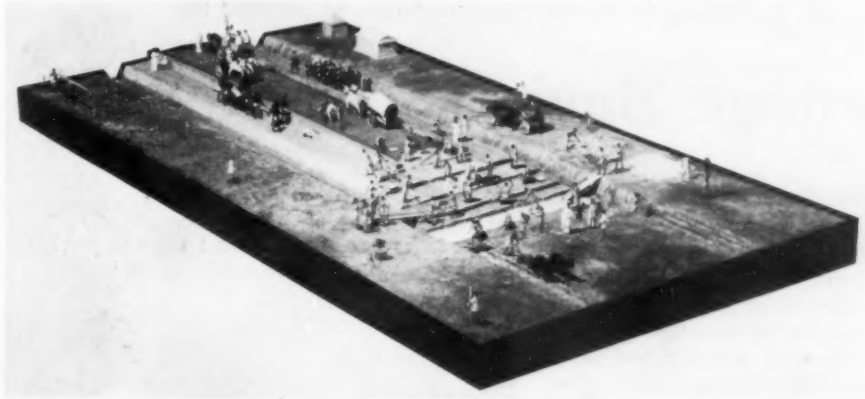
The Second Course

This second bed was made of broken stones smaller than those used in the first course and mixed with lime. For this layer freshly broken stones were used in the ratio of three parts of stone to one part of quicklime. When, however, the aggregate came from old buildings, an additional portion of lime was used in the ratio of two parts of lime to five parts of aggregate. The rammer was used to strengthen, equalize, and smooth it. This layer, whether formed of gravel or débris, was 9 inches in thickness after being thoroughly rammed.

The initial step in laying this course consisted in spreading a layer of mortar over the first course with a rake. The gravel or débris was then dumped upon the mortar and pounded into it with the tamper. The mortar was used in such a quantity that voids remained in the surface of the gravel or débris to which the next layer would form a substantial bond. Where the aggregate for this work was transported for a considerable distance, two-wheeled vehicles with basket bodies were regularly employed for carrying heavy burdens, general drawn by oxen.

The Third Course

Into the interstices left in the surface of the preceding course the third layer was bonded. It was a cement mortar composed of gravel or coarse sand and freshly slaked hot lime. This course was placed in successive layers each compacted with a roller. At the sides this course was about 1 foot thick and in the central section the thickness was increased to 1½ feet to form the crown. Into this freshly-laid mortar was bedded the wearing surface. The nucleus material formed the wearing surface for the side roads, which were at a lower level than the central roadway or agger.



A PHOTOGRAPH OF THE APPIAN WAY MODEL

The Wearing Course

The wearing course was bedded in the freshly laid third course within the central portion of the roadway between the side curbs. The high crown, of about 6 inches in 16 Roman feet or 15½ English feet, between the side curbs, was designed to facilitate the passage of the projecting hubs of chariots and the surface drainage of rainwater. Side drains were provided at intervals through the side curbs and under the side roads to the side ditches.

Especially on important roads like the Appian Way the top course was made of hard, wear-resisting stone like silex, or flint-like lava. This stone was placed in the form of pentagons, hexagons, or irregular polygons from 1 to 3 feet in diameter and some 6 inches in thickness. The upper surface was dressed smooth, but the bedded underside was left rough. The joints were fitted so closely as to be scarcely discernible. Where the volcanic silex was not available, other hard stones were used in-

stead, dressed and laid in the same manner. Occasionally the surface of the road was made of concrete. On some of the roads, blocks of schistose stone were laid on edge, like Belgian block. This type of construction has been found upon a portion of the Fosse Way in Britain. On the less important roads the surface was made frequently of gravel.

The side curbs projected 18 inches above the side roads and were 2 feet wide. They were built upon the foundation of large stones extending through the first course. At intervals there was placed, against these side curbs, a mounting block to facilitate mounting upon a horse.

The total thickness of the four courses described above varied from 3 to 4½ feet. The over-all width of the Appian Way at the surface was about 36 feet. Cross-sections of the road as given by Edward Cresy in 1856 and Alfred Leger in 1875 are almost identical.

Typical Traffic on the Appian Way

The chariot was probably the vehicle most commonly used by the ancient Romans. Although it found its greatest use as an instrument of war, the lightness of its construction made it suitable for rapid transportation upon the roads. It had two wheels, was built to hold the driver and another person, and was drawn by two or more horses. The choice of the other vehicles ranged from the luxurious litter through the humble family coach, and still more humble wagon. The pack animal was the poor man's method of traveling with a small amount of baggage in panniers supported by the pack saddle. The Roman infantry on the march, as at (23), could walk either in the central roadway or upon the side roads. The side curb provided an excellent walk-way for the commanding officer.

Milestones

The Romans placed milestones along their principal highways, spaced 1,000 Roman paces or 4,861 English feet, apart. In the vicinity of Rome these milestones represented the distance from the golden milestone erected by Augustus in the Roman forum to mark the origin of all the great military roads. Beyond one hundred miles from Rome and in the provinces the milestones showed the distance to the nearest principal town.

The Carthage Municipal Water Works

By **C. HOEN**
General Superintendent, Water and Electric Plant, Carthage, Mo.

PRIOR to the formation of the local Board of Public Works, the city of Carthage was supplied by a private company with water from a stream adjacent to the city. The system was inadequate, the source of supply unsatisfactory, and the water was supplied to the consumer without filtration or chlorination. Turbid water was the rule rather than the exception. The continued refusal of the company to improve the system forced the people to depend upon local springs, and water was frequently delivered to users by the barrel.

Strange as it may seem, this condition existed until 1907, when the citizens rose up in arms and voted a $220,000 bond issue to build a municipal water system. The newly created board, realizing the unsatisfactory character of the river supply, decided upon deep wells for the two water supplies. Today there are seven deep wells, varying in size from 10 to 12 inches in diameter and from 1,000 to 1,865 feet in depth. They supply an abundance of pure, clear, sparkling water. The distribution system varies in size from 16-inch to 4-inch cast iron mains and is approximately 40 miles in length.

There are 2,800 water consumers and all services are metered. Practically all the meters are installed at the curb, using the conventional meter tile and cover for the protection of the meter. There are 296 fire hydrants, which are installed and maintained by the Water Department and furnished gratis. The Department does not receive any revenue from any municipal service.

Recently an elevated storage tank was erected for the Department by R. D. Cole Mfg. Co., Newnan, Ga., permitting pumping to storage on off-peak loads. Prior to the installation of the elevated storage tank, the city operated with motor-driven direct-pressure pumps. The installation of the elevated tank has made it possible to effect a considerable reduction in operating costs. The saving is conservatively about 1 kilowatt per 1,000 gallons of water pumped.

THE COLE OVAL ELEVATED TANK OF 500,000-GALLONS CAPACITY AT CARTHAGE

The New Electrically Driven Pumping Station at Duluth, Minn.

By **E. A. MURRAY**
Industrial Engineering Department,
General Electric Company

AMONG recently completed municipal water-works projects is the Lakewood pumping station which supplies water to the city of Duluth. The water, taken from Lake Superior, is pumped from an intake well, 20 feet in diameter, through about 500 feet of pipe to the Lakewood detention basin and thence to the city reservoir, approximately 6½ miles distant and 290 feet above Lake Superior.

The pumping equipment originally installed in this station consisted of a high-lift centrifugal pump driven by a wound-rotor induction motor rated 1,500 hp at 750 rpm and 25 cycles. Two additional high-lift and three additional low-lift pumps have now been installed.

Synchronous motors rated 1,250 and 1,000 hp respectively, with a power factor of 1.0 and operating at 1,200 rpm on a power supply of 2,300-volt, 3-phase, 60-cycle, drive the new high-lift pumps. Two of the low-lift pumps are driven by 60-cycle squirrel-cage induction motors rated 250 and 200 hp respectively and operating at 720 rpm on a power supply of 2,300-volt, 3-phase; the third low-lift pump is driven by a 25-cycle squirrel-cage induction motor rated 250-hp at 750 rpm, 2,300-volt, 3-phase.

Method of Starting Motors

Each synchronous motor is designed for part-winding starting. The stator winding is divided into two circuits, arranged so that one circuit may be energized independently of the other. Starting is accomplished by energizing one circuit, then the other, and finally applying the field. With one circuit energized, the starting current and torque are reduced so that the motor accelerates to only part speed. When the second circuit is energized, the motor accelerates to its maximum speed as an induction motor. At this point field is applied and the motor synchronizes. This method of starting eliminates the need for a starting auto-transformer or reactor, does not interrupt the motor circuit at any time during the starting sequence, permits the use of only two oil circuit breakers for each motor, and results in low starting current.

Each squirrel-cage motor is started on full voltage.

Control Equipment

The control panels for the synchronous and induction motors, as well as the 60- and 25-cycle incoming line panels, are of the metal-enclosed type, arranged to form a compact switchboard. Each panel is constructed of stretcher-leveled steel and mounted on a self-supporting angle-iron framework. Each panel is provided with a removable metal back and top; metal end covers complete the enclosure. Breakers, instrument transformers, and buses are located within the structure. The front panels on which are mounted the meters, relays, indicating lamps, etc., are of the swinging type. Group-operated disconnecting switches, with operating handles permanently attached, are also mounted within the structure and are easily accessible after the swinging front panels are opened.

The control for each synchronous motor is completely automatic in operation, requiring only that the operator

GENERAL VIEW OF THE LAKEWOOD PUMPING STATION, DULUTH, MINN.
Showing the high- and low-lift Worthington pumps driven by General Electric motors

push a button to start the motor. The transition from starting to running connections is controlled by a relay of the adjustable time-delay type. Application of the field is made at the correct time by a field-application relay which is actuated when the slip-frequency reaches a predetermined value. In case the motor pulls out of step, the field is automatically removed by a power-factor field-removal relay. However, if normal conditions are restored within a reasonable time, the field is reapplied and the motor automatically resynchronizes provided the load conditions permit. If operation out of synchronism is prolonged, a temperature squirrel-cage-protective relay removes the motor from the line. The above control devices, together with a stator temperature overload relay, provide full protection for each motor against interruption of pumping service.

The control for each squirrel-cage induction motor likewise is completely automatic and provides protection against injurious heating under all conditions of operation. However, the control equipment for any motor will not unnecessarily interrupt service before the maximum safe operating temperature is reached.

Undervoltage and short-circuit protection are provided by relays mounted on the incoming line panels and are arranged to trip the incoming line breakers.

All oil circuit breakers are solenoid-operated except the breaker in the primary circuit of the 1,500-hp, wound-rotor induction motor, which is manually operated. Control power is obtained from a 125-volt storage battery charged by an induction motor-generator set.

Refuse Disposal and Steam Utilization in Atlanta

By **H. J. CATES**
Superintendent of Incineration, Atlanta, Ga.

THE set-up of the 250-ton incinerator that was completed and put into operation in Atlanta in August, 1914, was three 85-ton units with boilers and other auxiliary equipment for the production of steam. The excess steam was not utilized, however, but was allowed to go off into the atmosphere until January, 1925. At that time a contract was made between the city of Atlanta and the Georgia Power Co., for steam at 16 cents per thousand pounds up to 70,000,000 pounds, and 20 cents per thousand above that figure. There is a deficiency clause by which the city has to pay 4 cents per thousand for all steam below 260,000 pounds for 24 hours. For the years 1925, 1926 and 1927, the steam that was sold barely passed the 70,000,000-pound mark.

The city of Atlanta awarded to the Hiler Engineering Co. in 1927 a contract for a 100-ton plant, with the necessary auxiliary equipment to make a complete unit that could be run independently of the other plant. The Hiler company guaranteed to completely incinerate 100 tons of mixed refuse as hauled in from the city with a minimum combustion chamber temperature of 1450 degrees F. and with a boiler output of 12,000 pounds of steam per hour.

This unit was fired up about February 15, 1928, and was run for two weeks, and the results were carefully noted. On March 2 and 3 the acceptance test was run under the supervision of T. J. Hiler, of the Hiler company, Frank Lederlie, a disinterested consulting engineer, of Atlanta, and the Superintendent of Incineration. The test records showed that the incinerator exceeded the guarantees in every respect. The capacity test was finished in 17 hours, or 29.17 per cent better than was guaranteed. The combustion chamber temperature showed an average of 1756 degrees—21 per cent higher than the guarantee. The boiler output showed 16,310 pounds of steam per hour at an average pressure of 162.2 pounds with 144 degrees superheat, or 35.9 per cent better than the guarantee. After five years of constant service this unit is doing better than its builders guaranteed and has been very satisfactory.

Comparing Average Costs

From January 1, 1927, through December 31, 1932, the records show an increase of 30.2 per cent in refuse, an increase of 124 per cent in total steam generated, an increase of 102.6 per cent in total steam sold, and a revenue increase of 138.2 per cent.

A comparison of the average cost of burning per ton follows:

Average Cost	1927	1932	Reduction
Average cost	91c	75c	17.7 per cent
Credited for steam sold	71c	42c	40.8 per cent
Savings due to steam sold	20c	33c	

From a total of 187,739,600 pounds of refuse hauled to the plant in 1932, a total of 234,423,406 pounds of steam was generated at an average pressure of 157.2 pounds at 435 degrees temperature. The plant auxiliaries used 81,971,806 pounds, leaving a balance of 152,451,600 pounds sold for $27,275.45, which paid 7 per cent on the entire incinerator investment.

Analyses Throughout the Year

Throughout the entire year a regular and systematic analysis was carried out. The results were as follows:

	Per Cent	Tons
Paper	26.32	24,706
Bones	1.60	1,502
Bread	1.00	939
Wood	1.59	1,493
Rags	2.68	2,516
Produce	19.66	18,455
Glass	3.83	3,595
Metal	5.40	5,069
No. 1 screen material	10.70	10,044
No. 2 screen material	27.22	25,551
Total	100.00	93,870

Laboratory analysis showed an average Btu content on a wet basis, or as it was fired into the furnace, of 3,396 per pound; and on a dry basis, without metal or glass, of 7,470 Btu and an average moisture content of 33.96 per cent. In securing the sample for analysis, it is taken directly from the pit. The material is turned up and three times a day a 100-pound sample is taken out and dried at a temperature of not more than 210 to 212 degrees.

There is an engineer on each shift of plant operation, receiving 75 cents, and the stokers get 59 cents an hour. The laborers receive 29 cents an hour.

ACKNOWLEDGEMENT.—From a paper presented before the International Association of Public Works Officials.

THE FRONT OF THE ST. JOSEPH FILTRATION PLANT

A Filtration Plant in Southern Michigan

By **D. E. BICKNELL**
Superintendent of Public Works,
St. Joseph, Mich.

THE new city filtration and pumping station at St. Joseph is located on the shore of Lake Michigan within the city limits, and supplies water not only to the city proper, but also to a considerable outlying territory south of the city along the lake. It was built to replace an old steam-operated pumping station at the same location, which had been in service for nearly fifty years.

The main units of this completely electrified plant consist of (1) a gravity intake well and three low-service pumps with a combined rating of 6,000,000 gallons per day at a 35-foot head; (2) mixing tanks and coagulating basins designed to furnish 6,000,000 gallons per day with a proper retention period; (3) four filters, each with a normal rating of 1,000,000 gallons per 24 hours; (4) two clear wells and an underground reservoir with a combined capacity of 1,142,000 gallons for reserve storage; and (5) high-service pumps with a combined rating of 7,750,000 gallons per day, 3,000,000 gallons at a 160-foot head and 4,750,000 gallons at a 220-foot head.

The raw lake water is first brought into a circular reinforced concrete gravity well, 10 feet in diameter, with a bottom elevation 25 feet below lake level. At this point large particles of foreign matter are removed by a ¼-inch mesh vertical screen, which divides the well, separating the supply pipe from the low-service suction pipe.

The low-service pumps are located at lake level in a circular pit, approximately 20 feet below the high-service pumps, which are in the same room. There are three direct-connected motor-driven pumps rated as follows: 700, 1,400, and 2,100 gallons per minute at a 35-foot head. A primary dosage of chlorine is applied to the water in the suction line of these pumps.

Mixing Tanks and Coagulating Basins

There are two mixing tanks of equal size, each holding approximately 24,500 gallons, and two coagulating basins, also of equal size, and holding 250,000 gallons each. These four units are so arranged that they may be operated in series, parallel, or independently. Water from the low-service discharge pipe flows into a triangular distribution basin at the end of the mixing tanks. At this point a second chemical application is made. The chemicals used are aluminum sulfate, ammonium sulfate and powdered activated carbon. The alum and ammonia are applied through dry feed machines, while the carbon is applied in solution through a machine of our own design.

The water then enters the mixing tanks. Here there is a 30-minute mixing period when operating at a 4,000,000-gallon-per-day rate, before the water enters the coagulating basins. In the coagulating basins there is a four-hour retention period when operating at the normal rate, which is reduced to two hours at the maximum rate. The water leaving the coagulating basins enters an applied water flume common to all the filters.

Filters

There are four filters with a capacity of 1,000,000 gallons per day each. These are equipped with rate-of-flow controllers and rate-of-flow and loss-of-head indicating gages, the latter being mounted on individual control tables at each filter. The water after being filtered is collected by an underdrain system, and then enters a flume common to all filters, where the final dosage of chlorine is applied. Through this flume it is carried to the 1,000,000-gallon reservoir, and thence returns to the two interconnected clear wells. Here the water is picked up by the high-service pumps and discharged into the distribution system.

The filter effluents are so arranged that the filters may be washed with a wash-water pump or from the high-service discharge. The wash-water pump, located in the

same room with the high-service pumps, with remote controls at each filter, has a 16-inch discharge and is direct-connected to a 60-hp motor.

The High-Service Pumps

There are four motor-driven, direct-connected high-service pumps with a rated capacity as follows: two pumps, 700 and 1,400 gpm at a 160-foot head, and two pumps, 1,250 and 2,100 gpm at a 220-foot head. The 1,250 gpm pump is also direct-connected to a 130-hp gasoline marine engine auxiliary, for use in case of electric failure. All pump motors are operated at 440 volts from controls located in the room. There is an entrance from the pump room to an underground vault outside the plant which contains all the high voltage equipment, including all street-lighting controls and two banks of transformers.

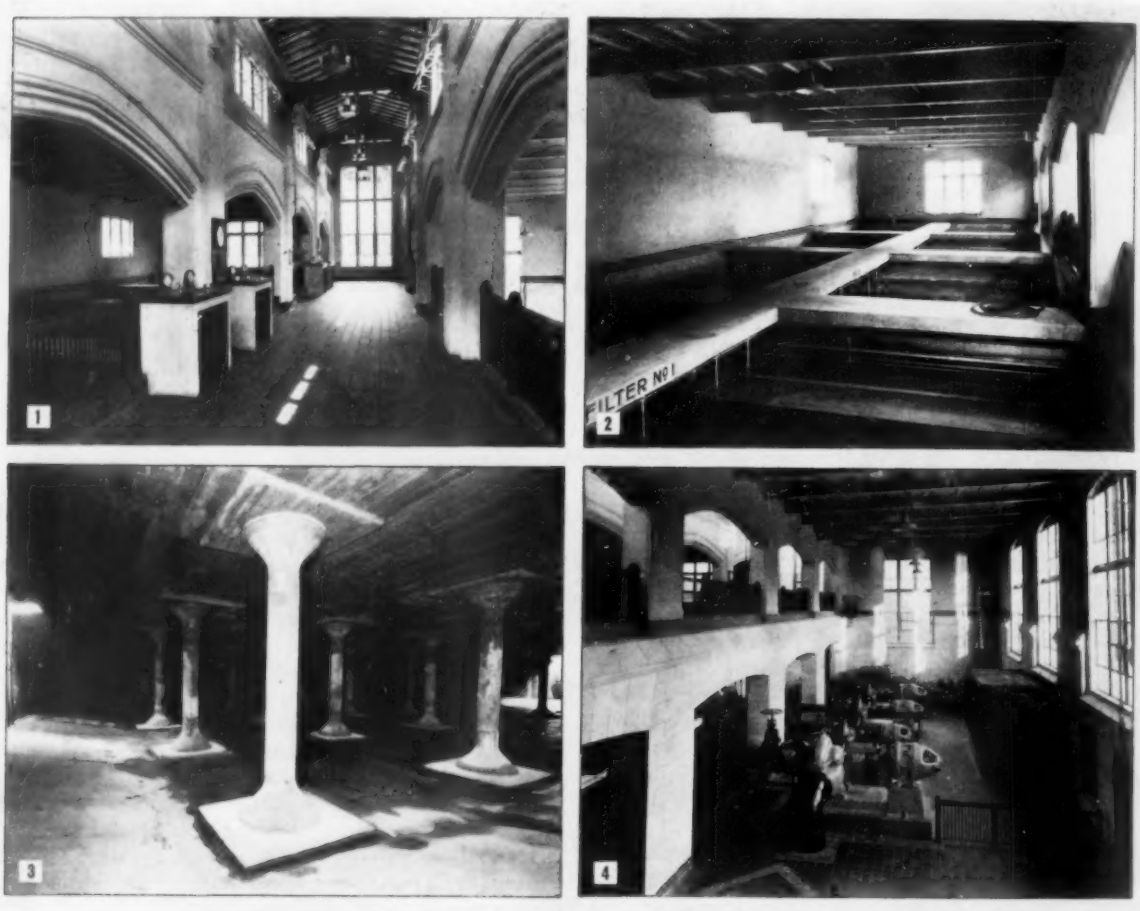
Every precaution has been taken to insure uninterrupted electric service by duplication of transformers, supply lines, etc.

Additional Equipment and Features

Included in the building is a superintendent's combined office and laboratory, completely equipped for making the numerous chemical, bacteriological and microscopic tests necessary for a constant check on the quality and purity of the water. A very complete set of records is kept of every phase of operation of the plant, with daily, weekly and monthly operating reports, and a set of indicating and recording meters, which are mounted on a panel in the pump room.

One unique feature of the plant is an instrument board in the office, on which are mounted gages and mercury and water columns that give a constant visual check on nearly every mechanical phase of the plant operation. An indicator on the board also gives the lake elevation above sea-level at all times. In connection with these instruments there is a bell alarm system so designed that any extraordinary change in the elevation of the water in standpipe, reservoir, coagulating basins or gravity well is immediately called to the attention of the operator.

This set of instruments, which has proved to be of tremendous value as an aid to the efficient operation of the plant, was designed and installed with the assistance of John E. Erickson, a local retired electrical and hydraulic engineer, who also gave his services as consultant during the construction of the plant.



FILTERS, STORAGE AND PUMPS AT THE ST. JOSEPH FILTRATION PLANT

1. The filter control gallery, showing the operating tables at each filter, the wash-water pump controls, and the meters mounted on the columns. 2. The tops of the filters. 3. A view of the one-million-gallon underground filtered water reservoir, taken while empty. 4. The high-service pump room, with the wash-water pump in the foreground, and the motor starting equipment in the cage at the right. The low-service pumps are in a pit just out of sight in the immediate foreground

Resurfacing Streets and Highways

By JOHN S. CRANDELL
Professor of Highway Engineering, University of Illinois

ABOUT twelve years ago I introduced and developed what is now well known as the retread type of resurfacing for low-grade surfaces. Its record has been good. Some changes in its materials and its construction have been gradually creeping in, but essentially it is the same as the original retread. The mixed-in-place or retread idea was apparently wrong in theory, but in practice it works well. The original jobs were all mixed with tar, but asphalt is also used now. The tendency at the moment is to use heavier grades of bitumen than formerly. In the summer time this is possible if the highway department is well organized and has sufficient forces and machinery to do the work quickly.

The highway official starting out to do retread work for the first time will find it better to use the less viscous material or he may find himself in serious difficulty. In 1933 New York State was handling its retread work with but one mixing. All the stone was placed on one side of the road, where it was "shot" with about 0.8-gallon of tar per square yard of surface. The tarred stone was then spread out over the entire roadway and turned once or twice. The road was rolled and the surface voids filled with ⅛- to ¼-inch stone chips. A seal coat of tar of ¼-gallon per square yard was applied, covered and rolled, and then a second seal and cover was applied and rolled. This method was used because it was believed that it would seal the surface against water and provide a top that would last longer without surface treatments.

If a gravel or macadam road is to be retreaded, it is advisable that, after the holes have been filled, the bumps taken off and the old surface made reasonably smooth, it be given a surface treatment of about ⅛-gallon per square yard of a light bitumen. This will keep the dust from mixing with the new material and will also be of service if rain should fall before the new top is put on. If retread is to be placed on old asphaltic concrete, brick or concrete pavement, it is necessary to make sure that the old surface is in condition to receive the new one. Waves, holes, bad cracks and disintegrated material will eventually show up in the new top unless they are patched before the resurfacing begins.

It cannot be brought too forcefully to the attention of highway officials that retreads, mixed-in-place tops and other similar jobs are merely cheap surfaces for light to medium traffic. They never were meant to carry heavy through traffic, and in the majority of cases they just won't do it. Every once in a while some misguided individual puts such a topping on Main Street and wonders why it goes to pieces long before he thought it should. Of course, there have been some miracle jobs with retread that have stood up wonderfully well under really heavy traffic, and their makers boast about them. But on the whole, retread is meant for secondary roads, and in such locations they give excellent service for little money. There are many miles of mixed-in-place jobs right now that should be resurfaced by using the same method. In this way it is possible to build up a well-bound road surface, reasonably thick, that may some day be almost a real pavement.

Use Sanity in Resurfacing

What are the old pavements like that we must consider for resurfacing? What do we find to be resurfaced? Gravel, macadam, bituminous macadam, retread, bituminous concrete, sheet asphalt, cold mixes gone bad, brick, and concrete. Can we satisfactorily resurface each particular type? Yes, if we go about the work carefully, thoughtfully, earnestly and honestly. What shall we use? We can use any type to resurface any other type, but such a procedure might well be as foolish as putting a new Oriental rug over the old kitchen linoleum. Thus, it would be absurd to lay a sheet asphalt top over an old gravel road. Some one may say, "Well, it has been done," and no doubt it has, but that does not mean that it was a sane thing to do.

Penetration Bituminous Macadam

There are many types other than retread that can be used for old gravel and macadam roads either in the city or in the country. Penetration macadam is next on the list. It is inexpensive and, if properly laid and maintained, will give a good account of itself, but it must be *properly* laid. Penetration roads have often earned a bad name because of carelessness of construction rather than for any other reason. Too much has been taken for granted and too little study has been given to the work on the part of the builders. Slipshod methods have produced miserable results.

If you do not know exactly how to go about constructing a penetration macadam pavement, do not be ashamed of your ignorance—there are many others like you—but get the representative of the company that sold you the binder to stick with you until you do. Study the pamphlets published by the materials company before you begin to spend any money. There is not space available to go into the details of construction here,* nor to explain the asphalts, asphaltic emulsions, or tars that may be used, I can assure you that penetration macadam has not the high name it should have, and that the fault is not with the pavement.

Preparation of Gravel Streets for Resurfacing

Gravel streets in towns may be resurfaced with higher types then those mentioned above, provided the gravel is well consolidated and at least 10 inches thick. Such a gravel makes a substantial base for asphaltic concrete, brick or concrete tops. But it must be remembered that in

* See "Construction and Cost of Standard Penetration Macadam Roadway in Massachusetts," THE AMERICAN CITY, February, 1934, pages 60-63.

towns, and perhaps in villages too, allowance must be made for raising manhole covers, catch-basins, inlets, utilities' boxes and so on. Resurfacing with these expensive materials is not a haphazard affair, and the estimates must include all the extras as well as many other items that may come into the local picture. If the gravel or macadam street is to be resurfaced with asphaltic concrete, the new tops must not be less than 2 inches thick and preferably more than that. Brick will require at least 3¾ inches and concrete at least 5 inches. Hence, particular attention must be given to the curbs, gutters, street intersections and manholes.

Many of the old gravel and macadam streets are high-crowned, and in this day of high speed no one likes a high crown. Under the provisions of PWA it is a simple matter to remove these objectionable crowns with hand labor; in fact, much of the cost of the new top can be charged off to this kind of work, and indeed must be so charged if the labor costs and material costs are to balance properly. If the old crown is removed, the flattened roadbed may then be too thin at the center. This should be ascertained carefully by digging through to the subgrade in several places. It will not do to resurface an old gravel road from which most of the gravel has been removed.

What Is the Most Suitable Resurfacing for Winter Work?

The question has arisen as to the most suitable resurfacing for winter projects. There is no type other than a block pavement that may be well laid in extremely cold weather. Even block pavements may not be satisfactory if their joints must be filled with bitumen or cement grout, since the former would chill so quickly that it would fail to enter the joints, and the grout would freeze before it set. It is possible, however, to lay two types of bituminous pavement in fairly cold weather. Asphaltic concrete may be laid, provided it reaches the job promptly from the mixing plant and is rapidly spread and rolled. If irregularities develop during the process, it is next to impossible to roll these out before the mixture has chilled so much as to be unmanageable. The other type is a cold mix made with a cut-back tar. It is suggested that the amount of solvent be increased so as to reduce the viscosity considerably below that used for summer work. One trouble in the preparation of this cold-mix is the difficulty of procuring dry stone in winter weather. These cut-back tar mixes may often be used when asphaltic cut-backs are not workable. If laid in the winter, these mixes should be given an early spring seal coat, and repairs must be made during the winter as often as may be necessary. Repairs may come frequently if the workmen are unfamiliar with this type of work, as was the case with most CWA laborers.

It is suggested that even under the present economic strain no work be done with actual paving when the temperature is less than 32 degrees F. In the Chicago area, paving continued well into the winter, starting the first of December. The work consisted of the resurfacing of about 600 miles of old macadam and bituminous pavements of one kind or another with asphaltic concrete. These old roads varied in thickness from 6 to 15 inches, and their cross-sections were those of the 90's.

If gravels or macadams are to be resurfaced with brick, some brain work should be done before starting field operations. Most certainly the old high crowns must be modified. Some oldtimers will say, "Do it with a thick sand cushion," and I say that any one that uses such a makeshift method should be jailed. The sand cushion has been the ruin of more good pavements than any other one factor. It would be possible to make a slush coat of sand, cement and water, as Illinois does for such work when resurfacing with brick over worn concrete, and strike it off, let it set, lay a mastic cushion on it and then lay the brick. Carefully done, this is the best scheme, but perhaps a cheaper method which will give as good results is to scarify the old surface along the center to remove the crown. Then roll well, building up the sides where necessary with the material taken off the center. On this new surface a mastic cushion is spread with sharp sand and a suitable bitumen. The cushion should not be more than 2 inches thick at the maximum and not over 1 inch on the average. My personal laboratory experience, dating from tests made in 1914, and field work in the past three years, show conclusively that this mastic cushion should be made with 93 per cent sand and 7 per cent bitumen by weight. The brick are laid directly on the cushion, and rolled, and the joints filled with suitable asphalt filler.

The old road can be resurfaced with a regular concrete pavement, in which case an excellent result should be obtained, since the concrete would have a substantial base under it. If the old macadam is highly crowned, the pavement laid thereon will have a naturally thickened edge. Two such pavements have been observed personally and proved to be highly satisfactory.

Resurfacing Bituminous Macadam and Bituminous Concrete

What shall we do with the bituminous macadam or bituminous concrete street or road that needs resurfacing? First of all, carefully repair the old top, making the patches level with the rest of the pavement. Bumps and depressions will show up later if resurfaced with any bituminous type. Any method of resurfacing desired may be used. If a bituminous top is used, do not skimp on thickness. No matter what any salesman may say, it is impossible to get a good job with any material laid 1 inch thick. If the job is in town and a 2-inch resurfacing is laid, it will be found that the gutters will not be deep enough. It may be possible to skimp a little in thickness along the edges, say for a foot and a half from the curb, and so get sufficient depth to carry off the water.

It is possible to lay brick or asphalt block over the old pavement with good results, and excellent results may be secured with concrete.

A New Top for Sheet Asphalt

Frequently we find sheet asphalt that has gone bad for one reason or another and there is some doubt as to what to use to resurface it, especially in those localities where there is no asphalt plant. Usually the sheet asphalt was laid on a concrete base, and many times, if the asphalt is removed, the concrete will be found to be badly shattered or cracked. The base must be repaired before anything else is attempted.

The pavement may be resurfaced with any one of a half-dozen materials. A cold plant mix of aggregate and asphalt, such as Amiesite, or coal tar and aggregate, such as Tarvia-Lithic, is easy to lay and will give a good ac-

count of itself. If either of these is used, the holes in the pavement must be mended before the new top is laid. Asphalt block is another good material for resurfacing, provided there is a plant nearby so that freight rates are not too high. Rock asphalt has been used to advantage in such work. Paving brick is suitable, and if the old pavement is well patched before the brick are laid, it is possible to get a job that will last for generations. There is no good reason why a concrete resurfacing should not be satisfactory provided the thickness of the concrete does not interfere with intersections, curbs and inlets. E. M. Fleming, of the Portland Cement Association, says: "Over flexible or badly broken base pavements, a thickness of 5 inches is desirable. Resurfacing thinner than 4 inches is satisfactory only for strictly residential streets carrying vehicles of light weight, or where the base pavement is new and unbroken." On rural highways 5 inches would not involve construction problems, but in town considerable care and ingenuity would have to be exercised to avoid unpleasant dips at street intersections, and the cost of resetting curbs, manholes and inlets must be taken into consideration.

Sometimes old sheet pavements were not laid on concrete, but on old stone block, brick, or anything handy. They may have been resurfacing jobs originally. The resurfacing of a poor pavement is something that should not be described other than to say that a good scarifier and a power shovel are the best implements to use.

If there is a mixing plant at hand the most sensible way to resurface sheet asphalt pavement is with sheet asphalt. It is usually possible to obtain a semi-portable plant if there is no permanent plant at hand.

Resurfacing Brick Pavements

Brick pavements may be resurfaced by any of the preceding methods. In addition, another scheme that sometimes works well is to remove and clean the bricks. Repair the foundation, lay a mastic cushion over it, and then relay the bricks with the reverse side up. There will be a loss of from 15 per cent to 30 per cent of the old bricks, and these should be replaced with others of similar size and color. The new bricks should be laid in their own area, for it is not good practice to mix the old with the new.

There are some very good examples of concrete laid over old bricks and I have seen some that are not so good. The latter are generally due to being too thin and to defects in the old pavement that were not improved before resurfacing began. There seems to be a diversity of opinion among engineers as to the propriety of laying concrete directly over the old bricks. Some believe that a cushion of some sort should separate them. I have seen jobs where the brick were given a surface treatment with tar and the new concrete were laid on that. I have seen others where the brick were simply well cleaned, sprinkled with water, and the concrete laid. There seems to be no difference in the resulting pavements.

Worn Concrete Pavements

A worn concrete pavement makes an excellent foundation, usually, for all types of resurfacing. Any of the preceding methods may be used, if certain details are attended to. If brick is to be laid over old concrete, it is highly desirable to widen the base by the addition of concrete curbs against which the brick may be laid. This is not necessary if the brick are grouted. Such a curb is advisable, however, for bituminous types.

Concrete over concrete is popular. Here, again, it will not do to skimp the job. If you feel able to spend the money necessary to lay a concrete pavement, why jeopardize the result by making the new top too thin? In general it has been found satisfactory to lay concrete 5 inches thick. There have been a few 3½- to 4-inch tops that have given good results, and there may have been many more that have not. If you are going to resurface concrete with concrete, do it thoroughly and well. Put on 5 inches of concrete and reinforce it with small steel members, closely spaced. Transverse joints should be placed at less than 30-foot intervals, and they should be carefully doweled. A center joint is also advisable, with adequate design for the transfer of load across the joint. While these joints add to the initial cost, they greatly reduce the maintenance and repair bills; therefore, it is well to use them.

ACKNOWLEDGMENT.—From a paper presented at the Twentieth Annual Road School, Purdue University, January, 1934.

Radio Rapidly Increasing Police Efficiency

SNATCHING criminals to justice by air is increasing, according to a survey made by the American Municipal Association, showing the wide use of police radio.

Seventy city police departments, comparing pre- and post-radio installation days, report an increase of from 25 to 50 per cent in the number of arrests made since they took to the air. Twenty-six of the 70 cities installed their sets within the past year. Detroit, which first operated its system successfully in 1928, holds the oldest place among ether-police. Aberdeen, Wash., and Las Vegas, N. M., are recent recruits.

Most of the cities say there has been no actual reduction of police costs since they put in radios, but that police efficiency has more than doubled. A number of cities which eliminated some of their patrolmen when radio was installed, however, report great savings. One city considers the radio equal to 100 additional policemen, whose services would cost about $200,000 a year.

The two-way radio, which allows mutual communication between police cars and headquarters, is the next step forward, the cities indicate. Although no large number of police departments have installed two-way radios, most of them say they are considering doing so, as soon as the radios are perfected to a greater degree.

The advantages of two-way radios include: (1) increased speed, due to saving of time in eliminating repetition of calls from headquarters; (2) less need for police boxes for reporting back; (3) increased secrecy; (4) intercommunication among police cars; (5) chance to call for help without leaving cars; (6) allowing superior officers in the field to direct police cars; (7) closer contact with headquarters.

Aside from several complete state police radio communication systems, at least 55 municipal systems serve surrounding territory also, the report shows. St. Louis' radio range amounts to approximately 472 square miles. Buffalo's territory is 1,034 square miles. Berkeley, Calif., serves 1,446 square miles.

Eleven cities report that they have also tried portable receiving sets for their patrolmen. These include Chicago, Los Angeles, Detroit and San Francisco. In general, experience with the portable receiving sets is declared favorable.

Beauty in Small Bridge Construction

Naugatuck, Conn., Believes That Utilitarian Structures Should Be Attractive

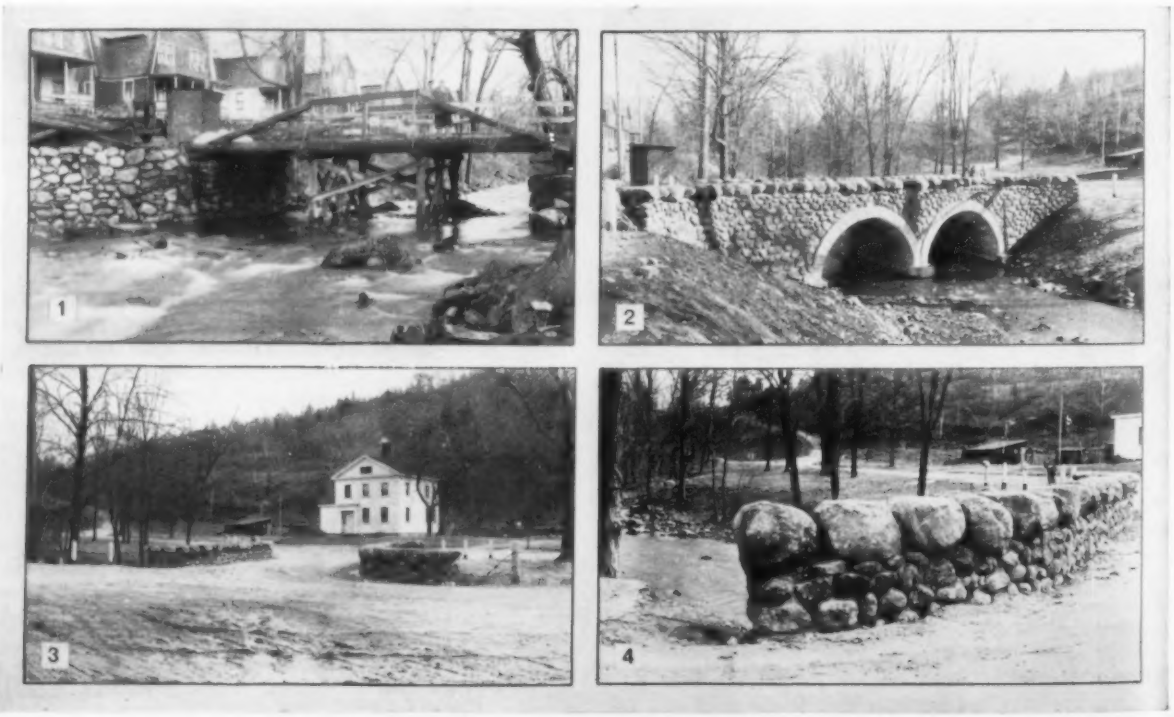
FOR many years officials responsible for the design and construction of public works, leaned distinctly towards strictly utilitarian design in structures. To a greater and greater extent, public officials and a portion of the general public who pay for the structures are coming to believe that if an improvement is so located that it will be seen by many people every day, then a pleasing appearance should be an essential part of the design.

One of the communities to show public appreciation of attractive utilitarian structures is Naugatuck, Conn. For years its public improvements, those which have been located above ground, have had to be something more than a mere improvement—they have had to fit into the landscape. Roadsides were not left as ragged cuts, but were beautified. Bridges have been treated artistically. About one mile south of the center of the town and but a few hundred yards from a heavily traveled through highway, there existed for some time a dangerous and unsightly wooden bridge over Beacon Hill Brook. The stream is the boundary line between the towns of Naugatuck and Beacon Falls, making the bridge a joint responsibility. In numerous cases joint responsibility has proved very troublesome, but in this case it was not permitted to stand in the way, for the town of Beacon Falls was equally anxious for the improvement and cooperated fully.

Conditions at the bridge were rather unusual in that traffic approached the bridge from four directions and all approaching traffic had a broadside view of the bridge. For this reason it was particularly desirable that the structure be of a pleasing appearance. The decision was made to use a twin arch of Armco Multi Plate with walls of native stone. Each arch is 12 feet 6 inches in span and 30 feet long. The center of the road is skewed 20 degrees in the direction of heaviest traffic. All four wing walls are curved to give traffic the maximum advantage in turning on and off the bridge.

The project was made a state-town aid project, the town taking the contract so that it might follow out its own ideas regarding construction and in order to utilize local unemployed labor from both towns. The masons were given practically free rein. They were told that a real job was desired and that they would not be hurried, with the result that all face stone were hand-picked, native stone of fairly uniform shape and uniformly weathered. Owing to the manner in which the work was handled, an outstandingly beautiful structure has been secured.

The original design, before it was made a state-town aid project, was by C. D. Curtis, Borough Engineer of Naugatuck. This formed the basis of the final design by the State Bridge Department. All work was done by the town of Naugatuck, under the direction of A. W. Bushell, Engineer of Contracts, and under the direct supervision of Daniel Linehan, Resident Engineer of Construction of the Connecticut State Highway Department.



THE OLD AND NEW BRIDGE STRUCTURES AT NAUGATUCK—AND SOME DETAILS

The Selection of Deep-Well Pumping Equipment

By R. E. SWANSON

Chief Engineer, A. D. Cook, Inc.

MANY conditions must be taken into consideration when buying deep-well pumping equipment. The size of the well, the pumping level and the quantity of water desired or available are the first considerations. Another which oftentimes is not properly considered is the quality of the water to be pumped. By quality I mean whether or not there are corrosive agents present, whether sand or other sediment is being pumped, etc. It is necessary to bear in mind that when waters of corrosive action are encountered, high velocities through the equipment should be avoided. It is a proven fact that high velocities accelerate corrosion to a marked degree. This is also true of erosion in the case of sand pumping, etc. Having ascertained the nature of the water, the wise purchaser will then determine what types of metals will stand up best and will select equipment which can be furnished of those materials.

Operating conditions also play a vital part in pump selection. The location of the well, whether automatic or manual operation is desired, and whether or not a variable capacity is necessary, must all be taken into consideration. In this connection it must be borne in mind that a plunger pump is of constant displacement while those of the centrifugal type may be varied at will should occasion demand.

Unless other conditions prohibit, the cost of pumping over a period of years should be the prime consideration. This cost, of course, is based not only on initial cost but also on depreciation, maintenance, interest on investment, efficiency, etc. And while considering efficiency, consideration should be given to the problem of *maintaining the efficiency over a period of years* at a reasonable cost, as well as the original efficiency itself.

A discussion of the history of pumping equipment is not necessary, except to say that the art has progressed. What was up-to-date in 1910 was obsolete in 1920; what was new in 1920 became inefficient in 1930. Thus, the customer must be informed as to what is new as well as what is best. He has three sources of information: first, the literature of the manufacturer; second, his own personal experience with equipment of this kind; and, third, discussion with those already informed. In pursuing the last-named course, however, he should be sure that he is getting the advice of some one who is unbiased and who really is trying to give him intelligent opinions, rather than some one who is merely trying to sell him something which he has for sale.

The Single-Stroke Pump

The single-stroke pump used in conjunction with a single-acting working barrel is undoubtedly the oldest type of deep-well pumping equipment still in use. Single-acting valves may be actuated by various methods, the most common of which are steam heads and geared (or power) heads. Steam pumps are practically obsolete, principally because they are very inefficient unless the exhaust steam can be used for heating or other purposes. The low efficiency is due to the fact that there is no expansion. Steam is admitted during the entire stroke, and when the exhaust valve opens, full pressure is exhausted. Furthermore, steam power is not universally available. These pumps do have the advantage of being very quiet, requiring a small amount of floor space, and having the ability to run smoother at slightly higher speeds. Furthermore, the stroke and speed can readily be changed to meet the well conditions, and they will last almost indefinitely.

Geared or power heads are taking the place of the steam pump in practically every instance. They may be driven by any sort of power available. Present-day designs are low in cost, very compact, and accessible, and lend themselves extremely well to automatic operation. Furthermore, efficiency attained in design renders them a very economical method of well pumping. This is especially true of domestic equipment installed on small wells for small capacities, the only disadvantages being that they are more or less noisy and are of constant capacity.

The range of application of single-stroke equipment depends upon the limits of the working barrels with which they are used. It should be borne in mind that large valves produce jerks and jars, varying in intensity, depending upon the type of valves used. Large working barrels should not be used with small power heads, since the natural impact of valve seating would be detrimental unless the head is large enough to successfully absorb it. Of course, excessive speed of reciprocating parts may always be classed as a misapplication and will shorten the life of the equipment.

Double-Acting Working Barrels

Double-acting working barrels (deriving their name from the fact that they discharge on both the up and the down strokes) are merely a cheap method of securing more water from a well with a single-stroke head. They are used with steam or geared heads with practically equal success, although possibly slightly better operation can be procured by the use of the steam head. Most designs will produce almost twice the capacity of the single-acting barrel, and because the pump head is loaded both on the up and the down strokes the over-all efficiency will be slightly higher. However, it is necessary that the pumping conditions be more accurately known for this type of barrel. Most companies do not recommend a submergence of over 15 or 20 feet, because excessive submergence will produce an unbalanced load. In any double-acting barrel the lift on the down stroke is measured from the bottom of the barrel, while on the up stroke it is measured from the pumping level, deducting, of course, friction through the barrel and drop pipe. Thus, in order to equalize the load on the head on both strokes,

it is desirable to keep the head on the up and down strokes as nearly equal as possible, which means a small amount of submergence.

While thousands of double-acting barrels have been in successful operation for long periods of time, they are not ideal pumping equipment. It has been my experience that in any kind of deep-well pump the simpler the construction the less likelihood of trouble. And, of course, double-acting barrels are not as simple as other types. Furthermore, one should not lose sight of the fact that on the down stroke the pump rods are in compression, and because of this fact they cannot be operated at speeds quite as high as the single-acting. A 6-inch barrel seems to be just about the practicable maximum as far as size is concerned. Unless they be small, differential cylinders should not be used with double-acting barrels. The load is slightly unbalanced already, since there is usually some submergence, and a differential cylinder will unbalance it all the more. In other words, if the latter were large enough, the water would only be pumped to the surface on the up stroke, while on the down stroke it would be working against total head.

Two-Stroke Pumps

Two-stroke pumps are undoubtedly the highest type of plunger pumping equipment. In recent laboratory tests I have found them surprisingly efficient. Combined pump and chain drive efficiencies of 60, 70, 80 and even 85 per cent were very easily obtained, depending upon the size of the unit. They produce large quantities of water, maintenance costs are extremely small, and they will run efficiently over a long period of years. Another thing that should not be lost sight of is the fact that this type of pump can be brought back to its original efficiency with very little outlay for repairs. A new set of cup leathers and valve rubbers may be expected to bring the efficiency back almost to that of a new pump. Furthermore, with modern designs relative to pump rods and valves, the old dread of rod and leather trouble has been reduced to a minimum. It is true that in a great many cases the first cost of this equipment would be higher than that, for instance, of the turbine, but first cost is only one of the many things to be considered. As stated before, cost per 1,000 gallons over a period of years is what really counts.

The Turbine Pump

The most flexible and adaptable deep-well pump ever to be designed and built is the turbine. It is flexible as to head and capacity, is capable of extremely large quantities of water from a given size well, very quiet in operation, and requires small floor space; and the initial cost is usually lower than other types. At the higher capacities, especially, good efficiencies are obtained, and with the trend of present-day design it is very likely that efficiencies even for small capacities will be extremely good before long. Turbines are ideal for well development and testing, since they may be started off at zero capacity, gradually opening the gate valve in the discharge line to suit the conditions of the well. Back-washing is easily accomplished by simply starting and stopping the pump.

Some of the disadvantages of this type are: it is shorter-lived than the plunger pump; more expensive to maintain and keep up efficiency; and not so applicable to deep settings. Furthermore, these pumps are more susceptible to corrosion and erosion, owing to the high velocities encountered at the larger capacities.

Analysis of Pump Selection

It is impossible to outline a definite schedule regarding pump selection, since about 50 per cent of the jobs require an individual analysis. Some conditions definitely fall to one type, others may fall under two or three different types. Small wells and small capacities, of course, are definitely single-stroke, single-acting for any depth; small wells for small to medium capacities, where most misapplications are encountered. A great number of jobs have recently come to my attention where small capacities against very high heads were being pumped by turbines where they should have been plunger pump installations. This condition is no doubt due to the fact that the buying public have become turbine-conscious to a fault. They are, of course, in a large measure excusable. Turbines run so smoothly and deliver so much more water with so little apparent effort that they have a great appeal.

I wish it were possible to draw hard and fast lines of demarkation definitely fixing sizes, depth, capacities, etc., for all types of pumps. At the risk of being called too conservative by some and too modern and enthusiastic by others, I will attempt to set forth a general idea of the conditions for the various types:

Type	Minimum Size W.B.	Minimum Size Well	Maximum Size W.B.	Maximum Size Well	Max. Depth	Max. G.P.M.
Single-stroke, single-acting	2	2	9¾	12	....	200
Single-stroke, double-acting	2	3	6	8	300′	125
Two-stroke.....	2¾	4	9¾	12	500′	350
Turbine		6		24	250′-3,450 400′-1,760 450′-1,160	8,000

Of course the values in the above table are only approximations. Practically all manufacturers have exceeded the depth and sizes given, with very good success, and the figures merely represent rather conservative estimates.

ACKNOWEDGMENT.—From a paper presented before the National Association of Well Drillers.

Vacations in an Untaxed World

THE approach of the vacation season makes timely the reprinting of the following item which appeared last year in *Citizens' Business*, the weekly leaflet of the Philadelphia Bureau of Municipal Research:

"Some one recently wrote—and some one else published—the statement that 'if there were no taxes every wage-earner could take Monday and Tuesday off,' and that 'he or she could take four months off every year without doing a lick of work and yet have just as much money in their pocket as they now have.'

"Well, we do pay more than we should for what we get from government—though that is true also of many other things we buy.

"But what we should be interested in seeing next is a description of the wage-earner's rapturous enjoyment of his vacations, starting out with his tax money in his pocket, but lacking all the Federal, state, and local government services for which the taxes would have paid.

"There would be no lack of vacation diversions. In Philadelphia, for illustration, those wage-earners who had survived impure water, lawless elements, contagious diseases, conflagrations, etc., could (still keeping their tax money tight in their pockets) begin their summer vacations by disposing of the winter's accumulation of ashes."

A Study of Water Consumption and Metering Part III

How Much Would Complete Metering of Water Services Save the City of Philadelphia?

A Measure of the Demand for Water

A fairly dependable index of the change in the demand for water in Philadelphia is the total of the bills sent out. Bills for schedule (unmetered) services indicate only in a general way the amount of water supplied, because the charge is based, not on the volume of water taken, but on the number and kind of fixtures and the size of the connection with the water main. Also, the total of the minimum bills for metered services, which are based on the size of connection and are rendered at the beginning of each year, are less closely related to the demand for water than are the quarterly bills rendered for water taken in excess of the allowance for the minimum charge. In 1927 the total of the bills rendered for schedule or fixture charges was $3,160,196, according to the report of the City Controller. The amount decreased each year and in 1932 was $3,011,448—$148,748 less than in 1927, which would be expected from the falling-off in the number of unmetered services. Figures for metered services tell a somewhat different story. The total of the minimum charges was $2,099,855.40 in 1927 and increased each year to $2,539,173.29 in 1931, but decreased to $2,525,847.24 in 1932. From 1927 to 1932 the increase was $425,991.84, or 20 per cent. Figures of the Board of Revision of Taxes indicate the reason for the decrease in 1932. In that year the number of both masonry and frame dwellings decreased, although apartment houses increased slightly. Combined stores and dwellings decreased, as did factories, office buildings, and railroad stations. Small business and store properties, as well as banks and institutions, showed small increases. The net effect on properties, exclusive of unimproved parcels, was a decrease of 258. Records of the Bureau of Water show 1,526 fewer meters in 1932 than in 1931. As the minimum bills are rendered whether a large or small quantity of water is taken, a decrease in their total is affected more by a falling-off in meters than in volume of water.

The total of the quarterly bills for metered service is more closely related to the demand for water because they are based on volume of water used in excess of a minimum amount. In 1927, the quarterly meter bills totaled $1,424,840.78 and they increased to 1929, when they were $1,514,386.54. After 1929, the quarterly bills fell off more rapidly than they had been increasing, and in 1932 totaled $1,302,468.67. From 1927 to 1932 these bills decreased 8.5 per cent, but between 1929 and 1932 they decreased 14 per cent.

Net Result a Decrease

Broadly interpreted, the foregoing figures indicate a steady but not necessarily large decline in the demand of unmetered services for water. For metered services the figures show a substantial increase in numbers as compared with 1927 despite the slackening in expansion of recent years. The volume of water for which metered services were billed appears, however, to have been less in 1932 than in 1927—the net effect of increases in some classes of service and greater decreases in other classes.

Similarly, the decrease of 14,646 million gallons, or 11.6 per cent, in the total output of the water works from 1927 to 1932 has resulted from an excess of decreases over increases. A slight increase has undoubtedly occurred in domestic metered consumption, as suggested not only by Mr. Bankson's average, but also by a growth of between 3 and 4 per cent in population, by the increase in metered services, and by an increase of 3 per cent in dwellings and 22 per cent in apartments in 1928-32. Increases in properties are figured from 1928 because the classifications of the Board of Revision of Taxes were revised beginning with 1928, and consequently 1927 is not comparable with 1932. The available data indicate that an increase of 4 per cent in metered domestic consumption is reasonable for Philadelphia. If the 1.35 billion cubic feet of metered domestic consumption in 1927 is converted into gallons and the 13 per cent added for under-registration, the total is 11.47 billion gallons. Four per cent is 0.46 billion gallons, estimated as the increase in 1932. It is probable, also, that an increase took place in institutional metered consumption. There were, in 1932, nearly 7 per cent more institutions than in 1927, and the changed economic situation has undoubtedly added to the burden upon institutions. Lacking a better indication, 7 per cent increase in institutional metered consumption is assumed, and by the same means of computation used for domestic meters 0.22 billion gallons is obtained for the amount of increase.

In industrial metered use a substantial decrease undoubtedly occurred. Mr. Bankson's average was 13 per cent, but the city having the greatest reduction lost 41 per cent. Although factories, mills, foundries, etc., in Philadelphia increased a little over 1 per cent in number from 1928 to 1932, all available information points to a reduction in consumption. As the reduction in quarterly bills, which is a net result of increase in bills for some uses of water and decreases in others, was 8.5 per cent, the falling-off in industrial consumption in order to outweigh increases in other uses must have been more than 8.5 per cent. That it probably decreased more than the 13 per cent of Mr. Bankson's averages is suggested by the drop of 14 per cent after 1929, when industry was hardest hit. An assumption of 15 per cent seems justified and, by the method of computation previously used, a reduction of 4.76 billion gallons is estimated. These approximations of 0.44 and 0.22 billion gallons increase and 4.76 billion gallons decrease give a net reduction of 4.1 billion gallons in metered consumption from 1927 to 1932. As this is an 8.9 per cent decrease in total metered consumption and the decrease in quarterly bills was 8.5 per cent, the estimate seems reasonable.

Since 1927 many public improvements including schools, other public buildings, subways, streets, sewers, and others which require water for use or maintenance have increased

municipal demands for water. There were, in 1932, 4 per cent more schools and 3.6 per cent more of other public properties than in 1928. These figures are for the period from 1928-32, whereas this study covers the period 1927-32. Some increase in municipal consumption no doubt creases in the mileage of streets, sewers, and similar im- for comparison, the 1932 total would probably show a larger percentage of increase. Also, very substantial increases in the mileage of streets, sewers, and similar improvements requiring water for operation or maintenance were made, and the demands of these other structures for water may have exceeded 4 per cent. For example, the square yards of paved streets to be flushed with water or otherwise cleaned increased nearly 10 per cent from the end of 1927 to the end of 1932. An increase of slightly more than 4 per cent in municipal consumption is indicated, and 1 billion gallons, or about 5 per cent, is assumed.

Concerning losses in the distribution system in 1932, there is reason to assume that these were less than in 1927. The waste survey undoubtedly had its effect, but it is unlikely that the losses were less by the 12.4 billion gallons of leakage found during the survey. Nearly 150 miles of mains had been added to the distribution system, and in 1932 several serious breaks occurred. Moreover, the city has not been able to follow up the survey work to locate and stop new leaks. How much of a reduction has actually been made is problematical. Eddy and Phillips in their article, previously mentioned, on Chicago conditions estimate the present losses in that city, with less than one-half of the mains surveyed, at 8.8 per cent of the average daily pumpage. If 8.8 per cent of the 1932 output of 111 billion gallons is used, 9.8 billion gallons is indicated for Philadelphia. However, Eddy and Phillips state that experience places the leakage that has developed in the surveyed mileage since the work was completed at 6,000 gallons a mile a day. Using this figure and 2,465, the Philadelphia mileage of mains (exclusive of the high-pressure fire service, a separate system) in 1932, gives 5.4 billion gallons of leakage. Local conditions in Philadelphia point to a higher probable leakage than 6,000 gallons a mile a day. A figure between 5.4 and 9.8 billion gallons, but nearer the latter to include something for breakages, seems reasonable and 8 billion gallons is assumed. This is a decrease of 8 billion gallons from the estimate for 1927.

Estimated Unmetered Consumption in 1932

By way of summary, we have then an increase of 1 billion gallons in municipal use and decreases of 4 billions in metered consumption and 8 billions in distribution losses, giving a net decrease of 11 billion gallons. These items totaled 81 billion gallons in 1927. Subtracting 11 billion gallons gives 70 billion gallons as the estimated total for 1932. In 1932, the total output of the water works was a little over 111 billion gallons. Deducting 70 billions gives 41 billion gallons as the unmetered consumption in 1932.

Present Saving in Output

There were, in 1932, 250,020 unmetered services of the low-consumption group for which the study gave a registration per metered service of 81,300 gallons a year. If these services were metered, they would, on this basis, register 20.33 billion gallons. In the industrial group were 4,940 services for which 160,000 gallons a year was assumed as the registration per service with meters. For these, 0.79 billion gallons is computed, giving a total of 21.12 billion gallons as the estimated volume that would have been registered by meters on these services. In addition, a quantity of water would have passed unrecorded through the meters, and it seems reasonable to assume the 13 per cent under-registration previously used. This would come to 2.74 billion gallons. We arrive then at a total of approximately 24 billion gallons as the quantity required for these consumers. Subtracting from 41 billion gallons, the quantity that, it is estimated, was taken without meters, gives 17 billion gallons as the volume that would not have been required with complete metering of private services. Although this saving is 15 per cent of the 1932 output, it is 1 billion gallons less than the saving estimated for 1927. The saving obtainable by complete metering in the cost of operating the water works is consequently smaller now than it was five years ago. Instead of reducing the per capita consumption by 25 gallons a day as estimated for 1927, a reduction of 15 per cent would decrease the 1932 per capita figure by 23 gallons, that is, from 154 to 131 gallons per capita a day.

Present Financial Benefit

Installation of meters on all water services would increase the cost of meter reading by a somewhat smaller amount than in 1927 because fewer new meters would be added and the accounting, billing and collecting costs would not be increased quite as much. It is assumed that, instead of $160,000, these costs would be increased $150,000. On the same basis of $19 a million gallons for operating cost, the 17 billion gallons not required with complete metering would, if saved, give an estimated saving of $323,000. By deducting from this amount the $150,000 estimated as the extra cost of meter reading we arrive at a net saving of approximately $173,000 a year.

Conclusion

The outstanding conclusion, of course, is that complete metering of water services would, at the present time, produce a decrease in water consumption of about 17 billion gallons a year. While this saving is less than had previously been considered likely, it supports the oft-repeated recommendation that all services be metered. It is not certain that the net saving in operating costs alone would justify the expenditure by the city of an amount sufficient to meter all services not metered. However, there are other savings to be taken into account. Less plant capacity for pumping and treatment would be needed and smaller demands would be made on the sources of water supply. There is also the problem of meters already installed which have been paid for by the property-owners. Would the city, in fairness to the owners, have to buy these meters? A number of questions of this sort must be answered before the city's course can be defined, but this study has suggested that so long as the city delays in working out a solution it is suffering losses that can be prevented.

There are arguments in favor of complete metering in addition to that of economy in the use of water. Selling water by measured quantity is the fairest way for all classes of consumers. With a properly set-up schedule of charges each consumer pays a fair price for the water

which he buys and no one has the special privilege of taking an unlimited quantity for a fixed sum each year. The justice of metering weighs heavily in its favor.

Other Conditions Needing Attention

In the course of this study several conditions appeared which need attention. The municipal use of water was an important item in the calculations, and the possibility of better control of this use to render the necessary service with the least waste was evident. Loss of water in the distribution system is another controllable part of the output which, if neglected, puts a heavy burden on the water works. These losses showed the desirability of continuing the work to find and stop waste so that the improvement obtained by the five-year survey will not be lost. When the under-registration of meters was estimated, the quantities indicated the need of a routine procedure to maintain proper accuracy.

Perhaps the outstanding condition demonstrated by the study has been the great amount of time and effort required to get at information which has an important bearing on the operation of the water works. The influence on operation and income of the volume of water taken through meters, the amount used for municipal purposes, the quantity lost in leakage, and the volume taken by unmetered premises, is apparent. Other water works have found it practicable to maintain currently all or most of this information for use as a guide in administration. It puts a handicap on efficient operation if such important data are lacking.

COMPUTATION OF METERED WATER AND EFFECT OF METERING

TABULATION OF RESULTS

Year 1927		
Output of water works, 1927		125,983,400,000 gallons
Meter registrations	40,946,700,000	
Added for under-registration	5,323,000,000	
Metered consumption		46,269,700,000 "
Unmetered consumption		79,713,700,000 "
Rounded to		80 billion gallons
Municipal use		19 " "
Distribution losses and unmetered, private		61 " "
Distribution losses		16 " "
Unmetered private consumption		45 " "
Required by unmetered, if metered		27 " "
Saving by metering private services		18 " "
Year 1932		
Output of water works, 1932		111,337,500,000 gallons
Metered, 46 (1927) — 4 (decrease)	42 billion gals.	
Distribution losses, 16 — 8	8 " "	
Municipal use, 19 + 1	20 " "	
Total, metered, distribution losses, municipal use.		70 billion gallons
Unmetered, private, 1932		41 " "
Required by unmetered, if metered		24 " "
Saving by metering private services		17 " "

ACKNOWLEDGMENT.—A report prepared by Charles A. Howland, Staff Engineer, Bureau of Municipal Research of Philadelphia, and issued December, 1933.

National Chamber Holds Luncheon and Round Table on Regional and City Planning

AT the annual meeting last month of the Chamber of Commerce of the United States, in Washington, there was held a round table on Regional and City Planning under the chairmanship of Frederic A. Delano, Chairman of the National Planning Board, to discuss the relation of permanent recovery to regional and city planning.

A plea for tackling the problems of cities through realistic planning to bring about a better balance of residential and commercial and industrial districts, and to rehabilitate and rebuild wasteful slum and blighted areas, was made by Harland Bartholomew, city planning consultant, of St. Louis. He urged three measures to bring about social and economic stability and strength throughout the whole urban structure: (1) the official adoption of comprehensive city, county or regional plans; (2) the drastic revision of zoning ordinances, particularly with a view to reducing areas now zoned for commercial and industrial uses; (3) reconstruction of slum areas and rehabilitation of blighted areas.

"Unless we deliberately wish to invite economic collapse and social disintegration," said Mr. Bartholomew, "we must learn to organize as effectively for civic achievement as we have heretofore organized for commercial and industrial achievement. Our cities lack unity and balanced design because there is no organized public opinion demanding something else."

George L. Radcliffe, of Baltimore, District Chairman of the National Planning Board, pointed out in detail what has been accomplished along practical lines in relating planning procedure to soundly conceived public works programs in the Tenth District of the Public Works Administration.

Harrison P. Eddy, of Boston, President of the American Society of Civil Engineers, analyzed the public works program from an engineering viewpoint. "The public works program in itself," he said, "is not a cure-all for depressed business conditions and unemployment. There is little doubt, however, that by the summer of 1934 it will have proved itself of material assistance to business activity and re-employment. It is not unreasonable to expect that by midsummer, 4,500,000 persons who were unemployed in March of last year will have jobs.

Preceding the round table meeting, the Construction and Civic Development Department of the National Chamber held an informal luncheon conference with the presidents and executive officers of the following national organizations interested in various aspects of planning as it affects urban areas; American City Planning Institute, American Civic Association, American Engineering Council, American Institute of Architects, American Institute of Park Executives, American Municipal Association, American Society of Civil Engineers, American Society of Landscape Architects, American Society of Municipal Engineers, Governmental Research Association, International City Managers' Association, National Association of Housing Officials, National Association of Real Estate Boards, National Conference on City Planning, National Housing Association, National Municipal League and Public Administration Clearing House.

Attending the luncheon conference also were a number of important officials of the Federal Government concerned with planning and housing activities as they affect municipalities.

At the subsequent business meeting of the Chamber of Commerce of the United States, the following resolution was adopted:

CITY PLANNING

Twenty years of experience have demonstrated the desirability of proper planning of all forms of public works. Such procedure minimizes waste, eliminates unnecessary tax burdens, assists in stabilization of values, and promotes more soundly developed communities.

Planning of public works can be made effective only in so far as it is given official status, yet few cities, counties or states have enacted the necessary legislation enabling them to adopt official plans.

The United States Chamber of Commerce therefore endorses the policy of properly legalizing the preparation and adoption of official plans by properly constituted planning boards having jurisdiction in their respective areas of government, and urges local chambers of commerce to initiate and support the necessary legislation and adoption of such plans, and also through their own organizations or in cooperation with independently organized citizen groups to give the necessary citizen support.

F. STUART FITZPATRICK,
Manager, Construction and Civic Development Department.

A Sewage Disposal Plant Designed for Economical Operation

By ROBERT CRAMER
Robert Cramer & Sons, Consulting Engineers, Milwaukee, Wis.

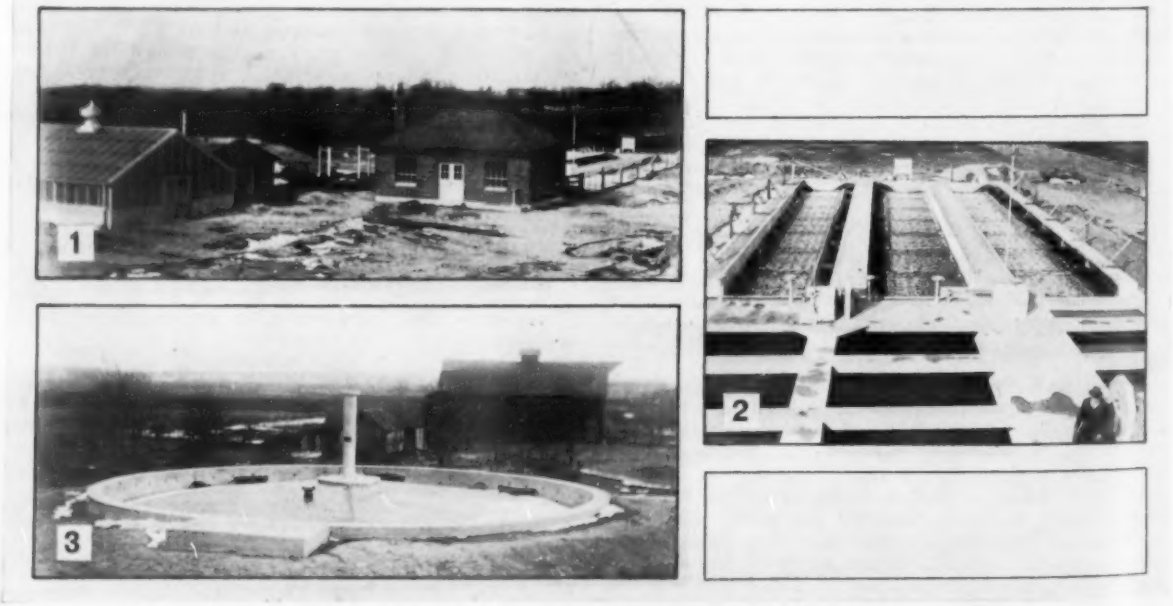
EARLY this year a new sewage disposal plant was put into operation at Fort Atkinson, Wis., in the design of which particular attention was paid to economical operation. Sewage disposal in general is an expensive necessity. For the reduction of the cost of operating the disposal plant three principal methods are available: the apparatus used should be designed for low power consumption; the gas generated in the sludge digester may be effectively utilized; and a revenue may be obtained through the sale of fertilizer. In the Fort Atkinson disposal plant all three methods have been used effectively.

The total load of the entire plant, in normal operation, including three sewage lifting pumps, is less than 15 kilowatts, and the energy consumed, including the intermittently operated waste sludge pump, averages 355 kwhrs per day. When the expected rate of gas production, one cubic foot per capita per day, is reached, the larger share of this energy (about two-thirds) will be supplied by generators driven by internal-combustion engines operating on the digester gas. The heat remaining in the exhaust from the engines is used, by means of a water heater, for keeping the digester at the optimum temperature.

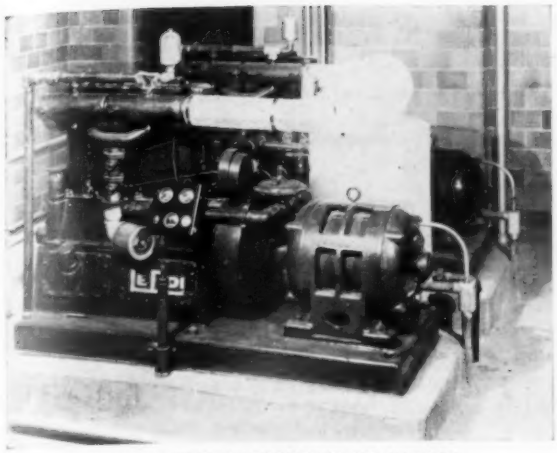
Utilization of Digester Gas

The continuous utilization for energy production of all the digester gas generated has been accomplished by a novel arrangement. The gas-engine-driven generator floats on the line of the public service current supply. With normal operating conditions the engine is not under the influence of a centrifugal governor, its speed being maintained by its operation in parallel with the public service current, while its power output is governed by a throttle valve, the opening of which is controlled by the amount of gas accumulated in a gas holder specially designed for this purpose. Thus whenever the rate of gas generation exceeds the rate at which the engine consumes gas, the surplus accumulates in the holder, the throttle opening is thereby increased, the engine uses more gas and produces more power, reducing the amount of purchased energy which must be drawn from the line. The reverse of this occurs when the rate of gas production decreases. Over any longer period, the gas consumption of the engine always equals the amount of gas generated, and the production of energy from gas is the maximum obtainable.

This arrangement is economically a great advance over the usual practices of either letting all gas go to waste or of using some of it for merely heating the digester contents during the cold season. It is also much more economical than the practice, found in a few plants, of driving particular items of machinery such as pumps and air compressors or mechanical aeration equipment. In these cases complete utilization of the gas is impossible because of



SCENES AT THE FORT ATKINSON ACTIVATED SLUDGE SEWAGE TREATMENT PLANT
1. A general view of the plant. 2. The aeration and settling tanks. 3. The digester with floating cover



THE GAS ENGINE OPERATED BY SEWAGE DIGESTER GAS

necessity the power requirements of the apparatus which the engine operates must be less than the power available from the gas. For practical operation the difference must be large, because gas is never generated at a perfectly uniform rate.

For emergency regulation in case of failure of the public service current supply, or in case the generator is disconnected from the line, a centrifugal governor operating a second throttle is provided, being adjusted for a speed somewhat above the normal full load speed of the engine.

Two Le Roi gas-engine-driven generator sets have been installed, but normally only one of them is operated at one time. The other one, while idle, may be cleaned, adjusted or repaired. According to the usual schedule, the operation is changed from one set to the other once a week, and the lubricating oil is renewed in the idle one.

The exhaust from the engine passes to a heater. A circulating pump forces water through this heater, a coil in the digester, and the heating system of the building. A coal-fired heater is also provided in the circuit, to be used when the total heat available from the exhaust gas is not sufficient for all purposes. It is expected that this condition may arise occasionally after one of the long periods of very low temperature which sometimes occur.

The Activated Sludge Plant

The Fort Atkinson sewage disposal plant, which was installed as a part of the Rock River clean-up program formulated several years ago by the Wisconsin State Board of Health, serves at present a population of 6,000 but has sufficient capacity for a population of 9,000. The plant treats all the liquid waste produced in the city, domestic sewage as well as industrial waste, but the sewage is not mixed with any storm water, since the total sewer system of the city is of the separate type. The principal industrial wastes come from a slaughterhouse, a sausage factory and several machinery manufacturing plants. At the present time the average normal sewage flow is about 420,000 gallons per 24 hours, the rate of flow during the day being about 0.6 mgd and during the night about 0.2 mgd.

The disposal plant provides complete treatment by the activated sludge process. The sewage first passes through a coarse screen and then successively through a primary settling tank, aeration tanks and final settling tanks. All settling tanks are of the rectangular type, equipped with Jeffrey sludge collectors. Mechanical aeration only is used and is accomplished by means of Link Belt Straight-line aerators. From the final settling tanks the effluent passes through a sewer directly into the Rock River.

The digester is equipped with a Downes floating cover. The gas generated is delivered through the special gas collector and through a flame and relief trap directly to the engines. A small branch leads from the gas line to the laboratory.

The surplus supernatant liquor from the digester is passed through a tank specially arranged for liming for the purpose of freeing the liquor from surplus nitrogen in the form of ammonia and albuminoids. After this treatment the liquor is also returned to the plant influent.

The service building houses the return sludge pump, the gas engine generators, a switchboard, transformer room, flame and relief trap, coal-fired heater and circulating pump; also a complete laboratory and office, an operator's wash room and three sewage lifting pumps, all so arranged that no sewage is exposed in the building, thus keeping the latter entirely odorless.

The digested sludge is drawn from the bottom of the digester to sludge drying beds which are completely enclosed and covered with corrugated wire glass which is strong enough to make hail insurance unnecessary. With this arrangement the drying beds can be used at any time independent of the season or the weather. The drain from the sludge drying beds is returned to the plant influent. The dried sludge will be used as fertilizer in the city's own parks, and the surplus will be sold to truck farmers and greenhouse men.

With the expected normal rate of gas generation of one cubic foot per capita per day, the annual return from the complete utilization of the gas at the rate which the city pays for electric current (1.76 cents per kwhr) is over $1,460 per year, an amount which defrays a large share of the operating cost.

The plant was designed by Robert Cramer & Sons, consulting engineers, Milwaukee. The construction work was done under a general contract by Fluor Brothers & Smith of Oshkosh, Wis. The engine generators were specially designed for the use of sewage digester gas and were furnished by the Le Roi Co., Milwaukee.

The Cost of Not Planning and Zoning

THE cost of city planning and zoning will be less than the cost of not planning and zoning. Just as many of today's obligatory municipal expenses are the results of yesterday's lack of city planning, much of tomorrow's expenses will be traceable to today's failure to plan ahead. The immediate cost of city planning and zoning is merely the cost of professional services rendered in the preparation of proper ordinances and in the survey and study of local conditions and the preparation of plans. No capital investment attaches to zoning, establishment of fire limits, building codes, housing and health and subdivision platting regulations. The cost of developing planned traffic thoroughfares, waterfronts and waterways, civic centers and recreation facilities will arise only as and when the municipality feels the need of materializing what has been planned. City planning and zoning create and conserve sound real estate values and improve housing conditions, prevent business and social losses due to congestion and wasteful development, promote improved health, traffic and fire regulations to protect life and property; and promote economy and efficiency in government by eliminating political expediency and group selfishness.

—From the Report of the National Fire Protection Association's Committee on City Planning and Zoning, 1934.

FORWARD STEPS

Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

Making the Motorist Think

BIRMINGHAM, ALA.—In this city for the past four years we have had a steady increase in the number of traffic fatalities, which has called for some drastic action in an effort to reduce the number of these tragedies. Last year 53 people were killed in the city as a result of motor accidents, and, with a determination to reduce this toll this year, in addition to strengthening our traffic squad of officers and installing some additional traffic lights, we have placed on twenty-four prominent intersections signs carrying this information:

THINK
10
Traffic
Deaths
This Year

The word "THINK" has been underlined in red paint, for the experienced traffic officer knows that the reasons usually given in court for accidents are superficial and incorrect. For instance, "Brakes failed to work"; "Rain obscured vision"; "Wet pavement"; "Sharp turn"; "Steering gear defective" and any others of the thousand stock statements, are in the discard, for the expert in traffic matters knows that behind any reason advanced is the mental action or inaction of the driver in question. If the mind of the driver functions properly, he will recognize conditions in advance, and act accordingly, and the danger will be removed before the accident happens. Except in the case of deliberate criminal intent or cold-blooded criminal carelessness, this rule is universal. So the greatest of all problems confronting those in charge of traffic enforcement, is that of making men and women drivers THINK. This is a matter of habit, and it is the duty of the Department of Public Safety to educate the people to think while operating a motor vehicle on the highways.

COMMISSIONER DOWNS AND POLICE CHIEF LUTHER HOLLUMS INSPECTING A TRAFFIC FATALITY SIGN IN BIRMINGHAM

The safe driver's mind is constantly active, and that activity is with the traffic situations in his immediate vicinity. The erection of signs setting forth the growing number of automobile fatalities I believe will have a tendency to set the mind of the average human being to working, and the reaction on the average driver will be exceedingly favorable from our point of view. Day in and day out these signs call attention to the deaths that have been occurring almost daily which could have been prevented by the exercise of proper care.

We have had only one fatal accident since these signs were put up several weeks ago, and we have every hope of being able to reduce this figure to the smallest number for several years past during the year 1934.

April 28, 1934.

W. O. DOWNS.
Commissioner, Department of Public Safety.

A Community Entertainment and Merchandising Plan That Made a Profitable Summer for Sparta

SPARTA, MICH.—The Chamber of Commerce in Sparta maintained the goodwill of the village and benefited the local merchants through a community entertainment program extending over thirteen weeks last summer, from June 3 to August 26, with the cooperation of the weekly newspaper, the *Sparta Sentinel-Leader*.

In previous years an annual homecoming celebration had been sponsored by the business men of Sparta, and, while it was successful in creating goodwill, so much expense and hard work was involved in carrying out the once-a-year program that the merchants themselves received little benefit. It was felt that some sort of once-a-week community effort spread over the summer and more closely tied up with merchandising efforts not only would be of more benefit to the public but also would bring profit to the merchants.

A mixed program of entertainment and merchandising was decided upon. The merchants were certain that by providing good entertainment in the home community over a long period they could induce their constituents to remain at home instead of going to the nearby cities for weekly recreation; and that by special merchandising effort they could keep the trade which had formerly gone out of the community. Saturday evening was chosen for the weekly entertainment, and the services of 91 men were enlisted in its preparation; thus thirteen weekly committees of seven each functioned under the direction of a general committee of three.

The Chamber of Commerce realized that it would be useless to attempt such an undertaking without the publicity given by the weekly paper in publishing the programs and urging the public to attend. Not only did the manager of the paper, H. J. Kurtz, agree to cooperate—he was one of those who, as a member of the Chamber, formulated and urged the adoption and promotion of the plan. Each week the paper published:

1. A formal program of the week's entertainment.
2. A detailed description of the events in the program as a news item.
3. A picture of the chairman of the week's entertainment committee and the names of all the other members of the committee.
4. Detailed comments on the previous week's entertainment.

In exchange for this cooperation, the Chamber contracted for a full page of merchants' advertising, paying double the usual advertising rate for this page in the paper and for the mailing of the page to all non-subscribers in the trading territory of the village. The space remained the same each week, but copy for the advertisement could be changed weekly.

To give the plan more zest and create anticipation, each week's program was kept secret by the committee in charge until its appearance in the paper. As each committee tried to outdo the others, a varied and high type of entertainment was provided. Three of the programs were by local talent, and the others were features from outside. There were concerts—quartette, male chorus, bands, orchestra; a minstrel show; a water battle between Sparta and Rockford firemen; a vaudeville entertainment; a boxing exhibition; outdoor educational farm moving pictures; and a balloon ascension and parachute drop.

The excellent results became immediately apparent, and continued to the end of the season. People came from as far as 20 miles away, and an average of about 2,000 attended the program each week. The *Sentinel-Leader* commented prominently:

"A survey made last Saturday found the streets of Sparta and Kent City lined with cars, and the sidewalks and stores literally jammed with shoppers. Customers seemed to be in a happy mood and were spending their money freely. . . . People are coming to these towns in great numbers to shop and visit. They meet old friends and neighbors. They like 'talking it over,' whether it concerns politics, taxes, farms,

schools, churches or social events. They all have a good time!"

The merchants themselves expressed appreciation of the increased business brought to them through the summer entertainment plan and the cooperative advertising in the local paper. More help had to be employed on Saturday evenings to take care of the extra trade, and the mixture of good fellowship, entertainment and business produced permanent benefits.

HARRY L. SPOONER.

An Efficient Motorcycle Squad

PHOENIX, ARIZ.—It has been our experience during the last fifteen years of police duty in Phoenix that motorcycles are absolutely necessary in maintaining control, especially in traffic. The fact that the motorcycle officer is on patrol of the streets tends to remind the motorist that he must be careful. It also puts fear into the minds of crooks who contemplate holding up stores. As escorts, in parades, and on other public occasions, motorcycles are the only mobile police equipment that can be used. A well-uniformed and courteous motorcycle squad is an outstanding advertisement for any city. When equipped with radio, motorcycles furnish excellent insurance against the success of criminal undertakings, because they can reach the scene before the criminal can make a getaway.

We have a full motorcycle squad in the Phoenix Police Department, under Sergeant Ernest A. Littlefield, who has formed one of the finest units in the West. The men are well trained in riot duty, using their motorcycles to form mobile wedges, diagonals, and a deployed line—methods which have proved very successful in moving and controlling large crowds. They form themselves into a regular drill team, which looks quite "snappy" with white uniforms and white machines.

This is a separate division in the Department and produces a handsome income annually through fines, which go into the general fund. We do not judge a motorcycle officer's efficiency by the cash he brings in in fines, but by the condition of his patrol, and the decrease of accidents and of injuries and death resulting from them. Phoenix has had only one traffic death since last August. Through constant and efficient patrol, our accident rate in general has decreased by 33 1/3 per cent. The squad has made friends of the public instead of losing their respect by petty persecution of drivers.

One motorcycle man is equal to six or eight foot-patrolmen for covering large beats. In one striking instance in Phoenix, radio and fast action enabled our motorcycle officers to intercept hold-up men coming out of the store they had robbed. The accompanying photograph gives an excellent idea of our city's motorcycle squad.

N. W. MATLOCK,
Chief of Police.

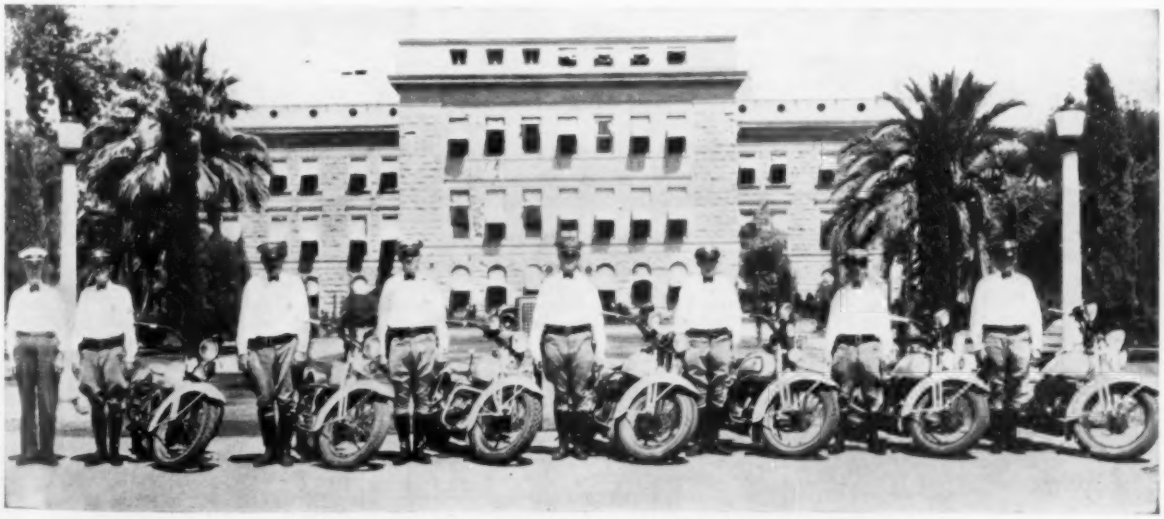
SCENE FROM "THE FLUTES OF JADE HAPPINESS," MUNICIPAL OPERA, LOS ANGELES
Produced under direction of the city's Playground and Recreation Department

Municipal Opera in Los Angeles

LOS ANGELES, CALIF.—"The Flutes of Jade Happiness," the new municipal opera locally written and directed and sung by local artists, was presented in its première performances on March 2 and 3 in the Los Angeles High School auditorium under the sponshorship of the city Department of Playground and Recreation.

Mary Carr Moore, well-known Los Angeles composer of opera fantasies and grand opera, wrote the delightful music of the Oriental romance, and Mrs. Leland S. Moore prepared the libretto and lyrics. The story is based on a Chinese legend of ancient times.

A notable cast appeared in the première presentation, supported by a chorus of sixty voices selected from the adult choral societies of the Los Angeles municipal recreation centers. Colorful cos-



THE MOTORCYCLE SQUAD OF THE POLICE DEPARTMENT, PHOENIX, ARIZ.

tuming and unique stage settings by Edward S. Langley, motion picture art director, added the final touch to this latest local effort in the field of municipal opera. The production was staged under direction of Mildred Sanger House and Frank Brown.

The presentation of the "Flutes of Jade Happiness" provided a practical demonstration of the feasibility of producing municipal opera under sponsorship of a city recreation department. Not only was the première well received by the critics and thoroughly enjoyed by a capacity audience, but it was also an enterprise which cost the city nothing, since receipts from the sale of tickets at the nominal price of twenty-five cents were ample to cover costs of production.

In addition to its enjoyment by a large audience, the opera proved a splendid recreational undertaking for its many participants, giving expression to a large number of local singers and an opportunity for local composers to secure public recognition for their manuscript works.

GEORGE HJELTE,
Superintendent, Department of Playground and Recreation.

How a City Made a Park without Cost

CORONA DEL MAR, CALIF.—A municipal incinerator is not commonly looked on as a site for beautification, but the employees of the one in Long Beach, Calif., have achieved almost a miracle with the materials they had at hand, and with their spare time.

A few years ago bare or weedy grounds and a collection of old cars and nondescript equipment lying about, met the eye of any visitor who might happen along that way. The incinerator was naturally located in the industrial part of the city. There were remains of old bulkheads which had once been in use to keep back the encroachment of the ocean, and the ground was rough and uneven. The superintendent and his six assistants got to work on this uninviting spot and have completely transformed it, besides actually filling in and making two acres of ground. By getting earth here and there from contractors who were glad to get rid of it, a hole where the ground had sunk along the bulkhead of the waterfront was filled and made this addition to the acreage. This was sodded, and now presents a level of green. The Harbor Department also constructed a maintenance building on the filled-in ground.

All the ground was cleared, fertilized and tilled without any extra expense to the city, for the materials came with the waste matter to the incinerator. Lawns were raised, and gravel paths laid out. Some discarded fancy bricks were utilized in building an "Old Oaken Bucket" with its simulated well, and its cunningly concealed outlet for water in the handles of the bucket underneath the rope knot. The handles are in reality made of small pipe, and the water for the well flows through these.

Now the park is a place of beauty, with its walks, its dahlia gardens, its cactus beds, and other flowers and shrubbery. There are seats at the best points for viewing the ocean and the battleships in the harbors of Long Beach and San Pedro, as well as the now attractive surroundings. On the opposite side of the flood-control channel is situated the electric light plant, and here, too, is a stretch of water often used by the rowing crews of the Navy vessels. Visitors come and linger in the attractive little park, now maintained by the Park Board of the city, which has acquired this charming asset worth thousands of dollars without any cost to itself.

THE "OLD OAKEN BUCKET" IS A CHARMING ADDITION TO THE GROUNDS OF THE INCINERATOR AT CORONA DEL MAR, CALIF.

The park is far enough removed from the incinerator to be free of odors, if there were any. The once unused and unsightly area has become one of the showplaces of the city. Not far away are industrial plants, and employees find this spot in the midst of the workaday section of the city a place where they may refresh themselves body and soul when they can find time to rest here a while.

DELPHIA PHILLIPS.

Recent City Manager Appointments

T. W. BROGDEN, City Commissioner, has been appointed Acting Manager, to succeed L. C. Bewsey, of Winter Haven, Fla.

Carl H. Peterson has been appointed City Manager of Muskegon, Mich., to succeed T. J. Pedler, who was injured in an automobile accident last summer and is still unable to assume the regular city duties. Mr. Peterson was formerly City Manager of Mt. Pleasant and Ferndale. He took office May 21.

C. Sophus Johnson has been reappointed City Manager of Grand Rapids, Mich., to succeed Ernest T. Conlon, who resigned on May 5. Mr. Johnson was City Manager from September, 1932, to May, 1933.

CLARENCE E. RIDLEY,
Executive Director, International City Managers Association.

The Municipal Bond Market

Recent sales of new issues, from May numbers of *The Bond Buyer*:

Amount	Borrower and Purpose	Rate (%)	Term (Years)	Basis (%)
$375,000	Oneonta, N. Y., Sewage Disposal	2.90	5.83	2.83
195,000	Albany Co., N. Y., Refunding	3	5.33	2.85
20,000,000	Pennsylvania, Veterans' Compensation	3	10-19	2.90
337,000	Easton, Pa., Refunding	3.125	10.33 Avg.	3.10
415,000	Cuyahoga Co., Ohio, Poor Relief	3.25	1.5 Avg.	3.13
115,000	Bristol, R. I., Sewage	3.5	12 Avg.	3.43
200,000	St. Paul, Minn., General Improvements	3.60	11.75 Avg.	3.52
1,324,000	San Francisco, Calif., Water Distribution	4	10 Avg.	3.73
100,000	Swissvale, Pa., Borough	4.25	1-10 Ser.	3.92
400,000	Springfield, Ill., Water Revenue	4	25	4
128,867	Center Township, Ind., Judgment Funding	4.25	6.33 Avg.	4.16
620,000	Pasadena, Calif., Water Project	4.25	10-40 Ser.	4.19
206,000	Marion Co., Ind., Refunding	4.25	5.25 Avg.	4.25
320,000	McLennan Co., Texas, Road	4.5	27 Avg.	4.37
2,000,000	Los Angeles, Calif., Water Works Election	4.25	1-40 Ser.	4.42
7,000,000	Chicago, Ill., Refunding	5	1-7 Ser.	4.72
119,000	Paterson, N. J., Improvements	6	11.16	6
212,000	Leonia, N. J., Improvements	6	11 Avg.	6.13

TRAFFIC CONTROL AND FACILITATION

Conducted by Publications Committee, Institute of Traffic Engineers, 175 Fifth Ave., New York

Maxwell Halsey, Chairman, Harry Hemmings, Reyburn Hoffman, Benoit Laberge, Theodore T. McCroskey, Donald M. McNeil, A. J. Naquin, Hawley S. Simpson, Arthur G. Straetz, Peter J. Stupka, Lawrence S. Tuttle, John C. Wrighton

The Photographic Method of Investigating Traffic Delays

By DR. BRUCE D. GREENSHIELDS
Professor of Engineering Science, Denison University, Granville, Ohio

A NEW and simple method of analyzing traffic has been developed at the University of Michigan. It makes use of pictures taken on motion picture film but at a much slower rate of speed than ordinary movies, the interval between exposures ranging from one-half to one and one-half seconds. The new method was originated in an attempt to secure more accurate and complete information than is possible by observers using stop-watches, mechanical counters, and tally sheets. The speed, acceleration (change of speed), and path of movement of all cars within the area studied can be obtained. The record is permanent and may be restudied at any time to reveal facts which are there for the skilled analyst to find and interpret.

THE CAMERA IN OPERATION

Field Method

The field method of securing the desired data is quite simple. A 16-mm movie camera capable of what is known as stop motion is used to take the pictures from a position preferably at right angles to the moving traffic. Above is shown the camera in operation. For city traffic the pictures are taken from a tall building above the street. A scale for the pictures is obtained by measuring the distances between fixed objects in the field of view, such as pavement markings, poles, and buildings.

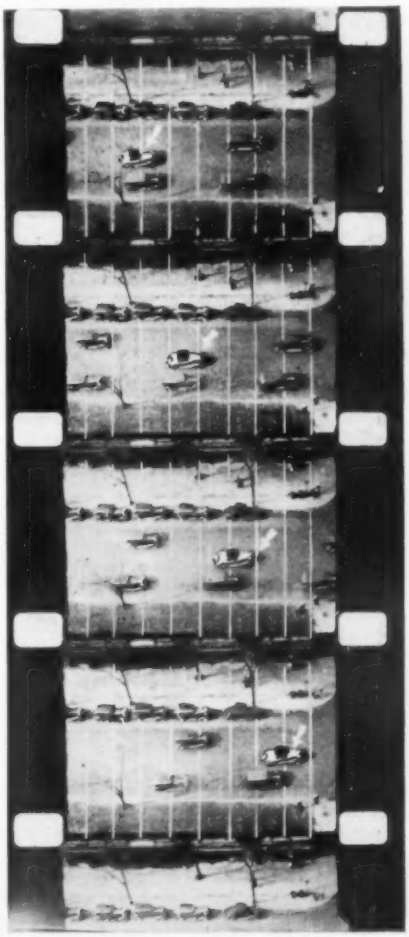
At the beginning of each film and at desired intervals of time, there is included a photograph of a bulletin board giving the location, date, hour, time interval used, shutter opening and other pertinent information.

Method of Analysis

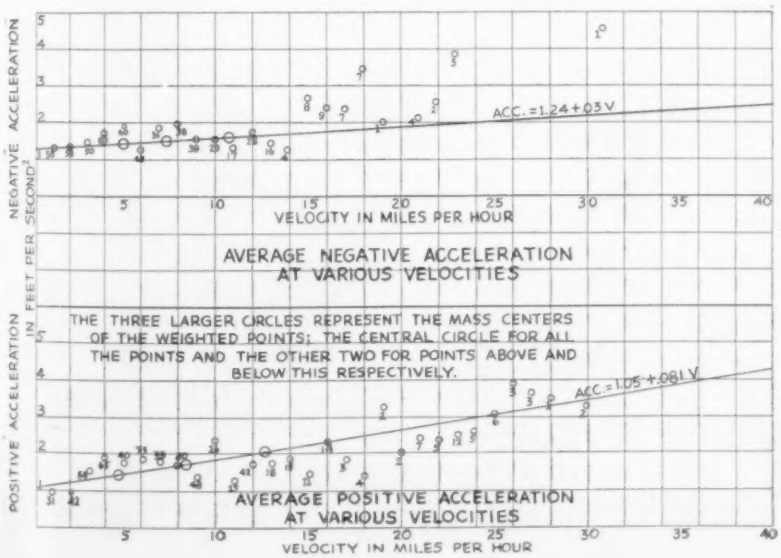
The process of analysis consists of two parts: first, the pictures are projected upon a white screen ruled with parallel markings and the throw of the lantern is adjusted so that these divisions shall represent 5- or 10-foot intervals along the roadway in the picture; and, second, the distance of travel or speed and the spacing between cars is taken off from two pictures, projected upon the screen at the same time. In order to obtain a traffic flow curve for the highway, the time may be read from the timer photographed.

The method of studying the pictures is illustrated at the right. In the first picture at the top, the car indicated by the arrow is at point 25 feet on the scale. In the second picture, 8/10-second later, it has advanced to point 42 feet on the scale and has traveled 17 feet. Reduced to miles per hour, this is 14.5. By reading the scale in the third picture it is found that the car has advanced to position 59, and in the fourth picture to position 76, so that the car is traveling 17 feet in each interval. There is no change in speed or acceleration for this car.

One use of the photographic method was to secure data for calculating the amount of time lost by traffic delays which are interferences with the normal flow of traffic that tend to diminish the normal rate of speed of vehicles, or stop them altogether for a period of time.



METHOD OF STUDYING THE PICTURES


NEGATIVE ACCELERATION IN FEET PER SECOND²
ACC.=1.24+.03V
VELOCITY IN MILES PER HOUR
AVERAGE NEGATIVE ACCELERATION AT VARIOUS VELOCITIES
THE THREE LARGER CIRCLES REPRESENT THE MASS CENTERS OF THE WEIGHTED POINTS; THE CENTRAL CIRCLE FOR ALL THE POINTS AND THE OTHER TWO FOR POINTS ABOVE AND BELOW THIS RESPECTIVELY.
POSITIVE ACCELERATION IN FEET PER SECOND²
ACC.=1.05+.081V
AVERAGE POSITIVE ACCELERATION AT VARIOUS VELOCITIES
VELOCITY IN MILES PER HOUR

Delays may arise from the condition of the roadway, obstructions in the roadway, traffic congestion, and traffic signals.

Studies involving several thousand pictures were made at different locations in Detroit, including such variations in conditions as were observed from the Barlum Tower, from the Fisher Building, and at the intersection of Outer Drive and Plymouth Road.

The acceleration and deceleration for varying velocities are plotted as on page 83. The sloping lines show the average acceleration and deceleration for varying speeds.

The acceleration, a_1, in feet per second, per second, may be expressed as:

$$a_1 = 1.05 + 0.08V$$

where V equals the velocity in miles per hour.

The deceleration, a_2, in feet per second per second, may be expressed as:

$$a_2 = 1.24 + 0.03V$$

The time lost in coming to a stop plus the wait for the signal plus the reaction-time in starting and stopping, plus the time lost in picking up speed, gives the total time lost for any car. The average minimum spacing between cars at various speeds, as well as the reaction-time, was obtained from another photographic study.

The following tables show the average time lost in bringing a car to stop from various speeds and the time lost in regaining these speeds after passing the delay.

TIME LOST IN BRINGING CAR TO STOP

TIME IN SECONDS

V	T_1 Time to Bring Car to Stop	D Distance in Feet to Bring Car to Stop	T_2 Time to Travel Distance D at Constant Speed	Time Lost by Car T_1—T_2
5	3.8	7	1.0	2.8
10	7.2	30	2.2	5.0
15	10.3	73	3.3	7.0
20	13.0	117	4.0	9.0
25	15.7	184	5.0	10.7
30	18.2	252	5.7	12.5
35	20.4	318	6.2	44.2
40	22.5	395	6.7	15.8

TIME LOST IN PICKING UP SPEED

TIME IN SECONDS

V	T_1 Time to Reach Normal Speed	D Distance in Feet to Reach Normal Speed	T_2 Time to Travel Distance D at Constant Speed	Time Lost by Car T_1—T_2
5	4.1	10	1.4	2.7
10	7.2	32	2.2	5.0
15	9.6	62	2.8	6.8
20	11.6	98	3.3	8.3
25	13.4	138	3.8	7.5
30	15.0	180	4.1	10.9
35	16.3	224	4.4	11.9
40	17.6	271	4.6	13.0

As an example, let the given conditions be that traffic is moving at an average speed of 15 miles per hour, that the spacing between cars is a minimum, and that the interruption is for one minute. By adding up the total time lost for a car we find it is 74 seconds. In the conditions given, since the stopping reaction-time (brake-reaction-time), equals .9-second and the starting reaction-time also equals .9-second, all cars in group are stopped 73 seconds.

If the conditions had been that the average speed was 20 miles per hour and that the density was 600 vehicles per hour, so that the spacing would not be a minimum, then the total time lost by the first car would have been 76.2 seconds, while the 18th, or last, car to lose time, would have lost only 1.32 seconds.

This is only one problem to which the method is applicable. The speed and spacing of all cars are easily found, and from these data congestion can be measured. If the free speed on a certain highway is 45 miles per hour and under a certain density of traffic the average speed is found to be 30 miles per hour, then the highway may be said to be one-third congested; that is, all cars are slowed down by one-third. The composition of the traffic should be the same for a true comparison. A study of speed and spacing also shows that the greater the speed, the more traffic moves over the highway in a given time.

Such questions as "Does marking lanes off on streets increase the flow?" can be most readily answered.

The cost of films is $3.00 for a 50-foot roll developed, and a 50-foot roll contains 2,000 single pictures. The cost, it is believed, compares favorably with that of any other method. A Simplex Pockette camera with a special timer has been used to take the pictures. The Eastman Kodak Co. is now prepared to furnish a special camera for this work.

Considering the quality of information obtained by the photographic method and its value in solving traffic problems, it is believed that engineers and officials concerned with the regulation of traffic will find it a very valuable tool. The Ohio State Highway Department is considering the use of the method this summer.

—This paper is abstracted from a talk given at the Twentieth Annual Michigan Highway Conference, University of Michigan, Ann Arbor, Mich., February 13, 1934.

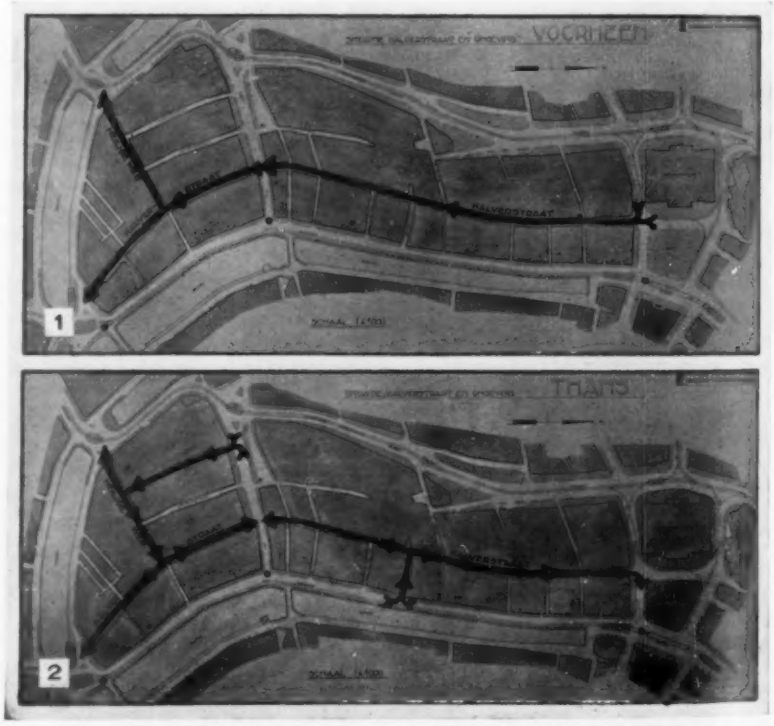
Discouraging Through Traffic from Using Business Streets

ACCORDING to Leo A. A. Cohen, Inspector of Police of the Amsterdam Traffic Department, one-way streets were used for the first time in Holland in the 17th century. The plan shown on Map I was successful on the two main streets of the shopping center from the beginning of the 19th century.

When, very recently, congestion rendered the area too inaccessible, a study was made to determine the per cent of through traffic which did not stop in this area. License numbers were copied at entrances and exits, and individual movements were thus timed. From 50 to 75 per cent were found to be through traffic.

An analysis of routes showed that this through traffic would profit by using other streets. Thus it was desirable from two separate points of view to divert through traffic from these congested business streets.

New one-way street regulations are being used in a rather ingenious way to



DIVERTING THROUGH TRAFFIC FROM CONGESTED BUSINESS STREETS IN AMSTERDAM, HOLLAND

The new one-way street plan (shown in Map 2) aids in lessening the traffic congestion which had persisted under the old one-way plan shown in Map 1

provide this. The two main streets have been divided into three sections—each one being one-way out from the center. Traffic can enter only by a street one-way in, to the center of each of these sections as shown on Map II. Bicycles and motorcycles are prohibited. It is claimed that the regulation has been highly successful.

Owner Responsible for His Car When Parked

A DEFINITE solution to the problem of arresting and convicting the operator of a parked car has been established in Boston.

The Massachusetts Supreme Judicial Court, in the case of *Commonwealth v. Augusta Ober,* has rendered a decision declaring constitutional the following regulation adopted by the Boston Traffic Commission:

"No person shall allow, permit or suffer any vehicle registered in his name to stand, or park in any street, way, highway, road or parkway under the control of the city in violation of any of the rules and regulations of the Traffic Commission of the city of Boston."

This eliminates entirely the chief difficulty formerly encountered. It is no longer necessary to ascertain the identity of the person who parked the car. The registered owner can be summoned directly into court. One of the commonest excuses of an individual claiming that he did not park the car has been removed. The old method practically required the officer to give the violator the ticket personally, at the time of the offence. Under the new arrangement it is possible to use tickets, since the owner is responsible.

The case arose from the "tagging" on several occasions of a car which had violated parking regulations. These tags were completely ignored. The defendant claimed that the burden of proving that the car was parked by her was upon the government or else the law was unconstitutional. The Court held that the law did not require knowledge of the offense, that the Legislature has the power to attach blame and punishment to an individual for a nuisance, and that the object of the regulation was to prevent the recurrence of the nuisance and not the punishment of the individual. "In a word, this is one of the unusual instances where a person at his peril must see to it that the rules and regulations are not violated by his act or the act of another." The illegally parked car thus establishes a *prima facie* case which must be met by the defendant.

Submitted by JOHN HURLEY.

Chart for Setting Progressive Traffic Signs

The attention of THE AMERICAN CITY has been called to the fact that in reproducing the chart published under the above heading in the issue of September, 1933, the third column was moved somewhat to the left, thus throwing the chart out of scale. Traffic engineers wishing to consult the correct chart may secure a copy from Frederick L. Mosher, of the Edison Electric Illuminating Co., 39 Boylston St., Boston, Mass.

Trends in City Costs and Debt Service

IT is estimated that 24 American cities having a population of at least 100,000 will spend for ordinary municipal purposes in 1934 approximately 20.5 per cent less than they did for similar purposes in 1931. During 1933 these cities spent about 19.4 per cent less than in 1931. The grand totals for ordinary operating and maintenance activities in these cities in actual figures are:

In 1931	$300,916,000
In 1932	260,528,000
In 1933	242,543,000
Appropriations and estimates for 1934	239,135,000

Here is a distinct trend, which is also indicated in 40 additional cities for which expenditure data only for the years 1933 and 1934 are available. For the 64 cities the aggregate operating expenditures are stated to be:

In 1933	$313,557,000
Estimated for 1934	309,159,000

Increases in payments for principal and interest on bonded indebtedness in the 24 larger cities have partially offset the reductions in operating expenditures. For the year 1934 the estimated payments on debt service in these cities are approximately 5.7 per cent higher than for 1931, and 7.8 per cent higher than for 1933. The actual amounts provided for bonds and interest in the four-year period in the 24 cities are: for 1931, $105,594,000; for 1932, $108,906,000; for 1933, $103,503,000; for 1934, $111,576,000.

In 1931 74.0 per cent of the total expenditures was for operation and maintenance in these larger cities, and 26.0 per cent for debt service; while the estimated expenditures for 1934 for these purposes are 68.2 per cent and 31.8 per cent respectively. Including the other 40 cities for which data on the 1933 and 1934 debt service are available, the percentages of debt service to total expenditures in the 64 cities are 28.5 per cent and 30.2 per cent for 1933 and 1934 respectively.

The difficulties coming through the increased percentage requirements for bond payments and the necessity for maintaining the essential public services without increasing total expenditures are being met in many cities through the adoption of refunding plans. Where such agreements can be worked out, there is the better assurance of meeting such payments and minimizing the possibility of debt defaults, debt scaling or repudiation.

The data upon which these analyses are based were reported by the officials in the respective cities and indicate the readjustments made to meet decreased public revenues and inability to pay as reflected in increased delinquencies. The amounts expended for unemployment and emergency relief purposes have been omitted because of the extraordinary nature of such services.

—Based on a statement released April 30, 1934, by J. L. Jacobs & Co., consultants in public administration and finance, Chicago, Ill.

Model Housing Breeds Model Tenants

"NEW Federal and state legislation and funds make it seem probable that low-cost housing will be undertaken in the near future on a larger scale than ever before in this country. An outline of the practices and experiences of an active modern project will therefore probably be of interest to all who are interested in the new developments, officially or otherwise."

With this introduction Abraham Goldfeld, Executive Director of the Fred L. Lavanburg Foundation, of New York, presents in a brochure published last month the "Practices and Experiences of the Lavanburg Homes." The following excerpts from the foreword and conclusions of the pamphlet are significant:

"The six-year history of the Lavanburg Homes . . . . has vindicated the theory upon which the Homes were originally planned. That theory was that a large proportion of the inhabitants of the slums of New York had the capacity to rear their children in a manner conducive to the well-being of the nation if society in any manner were to make it possible for them to live in decent, comfortable, dignified living quarters. . . . .

"Certain conclusions can be drawn with reasonable assurance from the experience here in the past six years.

"1. In spite of the fact that most of the tenants came to the Lavanburg Homes from abysmally poor and unsanitary districts, the building has not suffered from vandalism or carelessness. It indicates that families with low incomes are as ready as anyone else to accommodate themselves to decent living conditions if they can once attain to them.

"2. The number of families making applications for space in the building—1,200 before completion, with a long and apparently permanent waiting list—proves beyond argument that there exists a real and conscious demand in this economic group for good housing.

"3. Out of a total average population in the project of about 550, the average number of children has been nearly 350. Yet both the interior halls and the outside courts and walls present an appearance of cleanliness and neatness that many a more pretentious region might well envy. Children are *not* necessarily a detriment to property.

"4. Adults, with few exceptions, have behaved with as much social conscience as any group of the same size on any economic level. Despite all the irritations incident to normal human living, the project has gone on. Tenants will and do make such a project a genuine center of community life."

Water Rates and Service Charges, Installation Charges, Hydrant Rentals and Sprinkler Costs—II

Abstracts of Water Department and Company Reports

Ames, Iowa

Population	10,261
" served	9,800
Number of services	2,493
" " meters	2,493
" " hydrants	252
Miles of water main	36

A cash discount of 10% is allowed on all bills for domestic service if paid on or before the 10th of the month in which the bill becomes due. The meter rates for monthly consumption are:

1st—	750 cu. ft. or less	30c per 100 cu. ft
2nd—	750 " " "	25c " " " "
2nd—	1,500 " " "	20c " " " "
2nd—	3,000 " " "	18c " " " "
2nd—	6,000 " " "	15c " " " "
2nd—12,000 " " "		13c " " " "

Meter rentals are charged at the following rates per month for the sizes specified: less than 1", no charge; 1", 50c; 1½", 60c; 2", $1.00; 3", $1.50; 4", $3.00; and 6", $6.00. Each meter owned by the city must return a charge of 75c per month, for which the consumer is entitled to 285 cu. ft. of water per month. The rates above apply to monthly consumption through one meter, and no combination of readings from separate meters is permitted.

Applications for services must be made by master plumbers, who pay $1.00 for the permit. All work is done under the supervision of the City Manager or his authorized representative and must be started within 60 days from the issuance of the permit and be completed within one year after the beginning of the work, otherwise the permit is canceled and a new one must be obtained. The water meter, which remains the property of the city, is installed by the city on every private service connection in use. Meters are repaired at the cost of the city unless it is found that the damage to the meter has resulted through carelessness and negligence on the part of the consumer.

Taps in mains are made by master plumbers under certain restrictions. No larger than a ⅝" tap is allowed in a 4" main, a ¾" tap in a 6" main, or a 1" tap in an 8" main. All taps or connections larger than 1" are made by the city, and the property owner is charged the actual cost. The use of two or more taps in making a large connection is not permitted. All taps must be made in the upper half of the pipe at least 18" apart and on opposite sides of the pipe. No mains may be tapped nearer than 1 ft. to a joint. Service pipes of lead or copper are permitted with the inside diameter of the pipe at least ⅛" larger than the tap through which it is supplied. A corporation cock must be inserted at every tap, and a curb cock covered with a curb box must be installed 1 ft. outside the sidewalk, and in alleys within 1 ft. of the alley line.

There is no hydrant rental for either public or private hydrants, the latter being supplied through meters; and there is no sprinkler charge, since all sprinkler services are metered.

J. H. Ames,
City Manager.

Anniston, Ala.

Population	23,000
" served	28,000
Number of services	3,932 active
	1,736 inactive
" " meters	3,830 active
" " hydrants	243 public
	111 private
Miles of water main	92

The Water Department has minimum charges varying from $10.80 per year for a ⅝" meter up to $1.000.00 per year for a 6" meter. This minimum charge entitles the customer to an equivalent billing of water at the regular rates. The minimum charges in detail are:

⅝" meter with one fixture only	$ 10.80 per year
⅝" " " more than one fixture	16.00 " "
¾" " " " " "	24.00 " "
1" " " " " "	36.00 " "
1½" " " " " "	50.00 " "
2" " " " " "	100.00 " "
3" " " " " "	150.00 " "
4" " " " " "	400.00 " "
6" " " " " "	1000.00 " "

Meter Rates

First	1,000 cu. ft. per month (3,000 per qr.)	25c per 100 cu. ft.
Next	1,000 " " " 3,000 " "	20c " " " "
"	3,000 " " " 9,000 " "	15c " " " "
"	10,000 " " " 30,000 " "	10c " " " "
"	20,000 " " " 60,000 " "	8c " " " "
"	25,000 " " " 75,000 " "	6c " " " "
All over 60,000 cu. ft. per month		5c " " " "

Public fire protection is billed as a charge for fire hydrants, the cost being $50.00 per year per hydrant for the first ten hydrants, $40.00 per year per hydrant for the next 90 hydrants, and $30.00 per year for each hydrant over 100.

For fire protection in consideration of the company's readiness to serve, the net annual bills must be not less than $8.33 per diametrical inch of the customer's service connection supplying the fire protection, and the minimum charge for private automatic sprinkler systems must be one-half of this minimum. The private fire protection rates are as follows:

2½" double nozzle fire hydrants	$50.00 per year
2½" single " " "	24.00 " "
2¼" " " " "	20.00 " "
2" " " " "	16.00 " "
1½" " " " "	8.00 " "
1¼" " " " "	6.00 " "
1" " " " "	4.00 " "
Automatic sprinkler system, per head	10c

The bill for fire protection service arrived at by applying the above rates is subject to the following quantity discounts:

First	$100.00 per year	Net
Next	$400.00 " "	50% discount
Excess of	$500.00 " "	75% "

E. C. Knowlton,
Superintendent, Alabama Water Service Co.

Burlington, N. J.

Population	14,000
" served	15,000
Number of services	2,800
" " meters	80
" " hydrants	215
Miles of water main	21

The water rates are as follows:

First	100,000 gals. each year	25c per 1,000 gals.
Next	100,000 " " "	20c " " "
"	300,000 " " "	12c " " "
"	500,000 " " "	10c " " "
"	1,000,000 " " "	8c " " "
"	2,000,000 " " "	5c " " "

There is no charge for public fire hydrants. All private hydrants are billed at $4.50 per year for the first hydrant and $2.70 per year for each additional hydrant. The charge for private sprinkler systems for fire protection is $100.00 each per year.

Nat. G. Johnson,
Superintendent, Water Department.

Cedar Rapids, Iowa

Population	58,000
" served	56,000
Number of services	13,557
" " meters	13,595
" " hydrants	957
Miles of water main	119

Water is furnished at the following monthly meter rates:

First	500 cu. ft.	19c per 100 cu. ft.
Next	1,000 " "	18c " " " "
"	1,500 " "	15c " " " "
"	2,000 " "	13c " " " "
"	2,000 " "	12c " " " "
"	5,000 " "	10c " " " "
"	10,000 " "	9c " " " "
"	20,000 " "	8c " " " "
"	20,000 " "	7c " " " "
"	40,000 " "	6c " " " "
All over 102,000 cu. ft.		5c " " " "

The following monthly minimum rates apply when the consumption of the above rates does not equal the minimum charge:

Size of Meter Installed	Minimum Monthly Rate
⅝"	$ .90
¾"	1.00
1"	1.25
1¼"	1.50
1½"	1.75
2"	2.00
3"	3.00
4"	5.00
6"	10.00
8"	15.00
10"	25.00

The above rates are subject to a discount of 15% if the bills are paid within twenty days, and there is a discount on minimum monthly bills for ⅝" meters of 15c per month if paid within twenty days.

Water services require a written application and that taps or connections to the city water main be made by the Water Department for the plumber engaged by the applicant. The charge for this work is $2.50 for each tap up to 1½" in size. Where a service requires more than one tap, the cost is $2.50 for the first tap and $1.00 for each additional one. Taps must be paid for before they are made. Larger connections are made at the actual cost of labor and materials plus 10 per cent for overhead expenses. Where water mains are not laid in the center of a street, the water works makes an adjustment in the cost of water service pipe with the plumbers installing them, so that the cost to the consumer is the same as though the mains were laid in the center of the street. The laying of all service connections and pipes and the setting of water-service fixtures in streets, public grounds, etc., is made by employees of the city water works or by duly licensed plumbers.

There is no charge for hydrant rentals or for private fire sprinkler services.

H. F. BLOMQUIST,
Superintendent, City Water Works.

Columbia, S. C.

Population	51,000
" served	53,000
Number of services	8,000
" " meters	8,000
" " hydrants	710
Miles of water main	85

The water rates for the first 3,000 cu. ft. at $1.50 per 1,000 cu. ft. From 3,000 cu. ft. to 100,000 cu. ft. at $1.20 per 1,000 cu. ft. Over 100,000 cu. ft. at $1.05 per 1,000 cu. ft. All bills are collected monthly and a 20% discount is allowed if bill is paid within 10 days after date of delivery.

MONTHLY MINIMUM SERVICE CHARGES

¾" meter	$ 1.00
1" "	1.50
1½" "	2.00
2" "	3.00
3" "	5.00
4" "	10.00
6" "	20.00

At the time of making an application for a water service, the applicant pays to the water works the following costs for the tap, the total cost of the connection including the meter and meter box:

For ¾" tap	$20.00
" 1" "	25.00
" 1½" "	50.00
" 2" "	70.00

Water furnished consumers beyond the city limits is charged double the rates within the city.

There is no charge for public fire hydrants. The minimum rate for private fire hydrants on unmetered services to be used only in case of fire is $40.00 per year for each double-nozzle hydrant, payable monthly without discount. This charge is made on fire hydrants which are located on such premises as cotton factories, railroad yards and other industries using hydrants for private fire protection or which have been placed on the public highways for private fire protection, or additional protection other than that furnished by the city. Private hose connections for fire protection in buildings on unmetered services are charged at the following minimum rates with the applicant paying the entire cost of installation:

2"	$15.00 per year
3"	20.00 " "
4"	30.00 " "
6"	40.00 " "

The regulations require that a stop and waste cock, or cut-off valve, must be placed by the property owner at the property line or at points where the pipe leaves the street line. This cock or valve is under the control of the tenant or owners and is used in case of break or other necessity whereby pipes are to be repaired, making it unnecessary to use the street corporation cut-off.

GUY H. WHITE,
Water Works Superintendent.

Corvallis, Ore.

Population	8,000
" served	10,500
Number of services	2,500
" " meters	2,500
" " hydrants	162
Miles of water main	65

The city is 100 per cent metered and there is no charge of less than $1.50 per month for water. The minimum charge per month for service through the various sizes of meters is as given below except for compound meters on private fire service, on which the minimum charge is made for the smaller of the two meters.

MINIMUM CHARGE

⅝" and ¾"	$1.50 per month
1"	2.00 " "
1½"	2.50 " "
2"	3.50 " "
3" and over	5.00 " "

METER RATES

First 660 cu. ft.	$1.50
660 to 6,000 cu. ft.	10c per 100 cu. ft.
Over 6,000 cu. ft.	10c per 100 cu. ft. for total consumption

There are no hydrant rental charges and all private fire protection and sprinkler systems are charged at the meter rates quoted above.

E. L. STRANGE,
Superintendent, Water Department.

Dodge City, Kans.

Population	9,000
" served	9,500
Number of services	2,340
" " meters	2,340
" " hydrants	189
Miles of water main	40

There is a minimum charge of $1.00 per house per month for water. The meter rates are as follows:

First 10,000 gals. at	25c per 1,000
Next 40,000 " "	10c " "
" 50,000 to 300,000	8c " "
All over 300,000	5c " "

If the bill is not paid on or before the 10th of the month, a charge of 10% is added to the meter bill. If it becomes necessary to discontinue a service, a $1.00 charge is added.

There are no charges for either public or private fire hydrants.

REX REYNOLDS,
Superintendent, Water Department.

Jackson, Miss.

Population	48,357
" served	50,000
Number of services	8,200
" " meters	7,700
" " hydrants	1,057
Miles of water main	105

The minimum rate on meter service is $1.00 per month, with an extra charge for consumers outside the city limits. The water rates are as follows:

For	Per Month		Per 100 Cubic Feet
1st	1,000	cu. ft. at 20c	$2.00
2nd	1,000	" " " 16c	1.60
3rd	1,000	" " " 14c	1.40
4th	1,000	" " " 13c	1.30
5th	1,000	" " " 12c	1.20
2nd	5,000	" " " 11c	5.50
2nd	10,000	" " " 10c	10.00

Service connections of ⅝" and ¾" are charged at $15.00 each for installation, and 1" services, $20.00 each. Larger connections are billed at cost plus 10% for overhead.

No hydrant rentals are charged by the Water Department.

Sprinkler system connections are charged at cost plus 10%, and there is no charge for sprinkler services. Each service, however, is required to have a suitable meter connected to the line.

J. H. FEWELL,
Superintendent, Jackson Water Works.

Hanover, Pa.

Population	12,000
" served	17,000
Number of services	4,600
" " meters	250
" " hydrants	208
Miles of water main	56

The monthly meter rates for the Hanover municipal water works are as follows:

		Totals gals.				Totals
First	1,167				.67	
Next	2,000	3,167	"	@ .50	1.00	1.67
"	3,333	6,500	"	@ .30	1.00	2.67
"	3,500	10,000	"	@ .25	.88	3.55
"	3,333	13,333	"	@ .20	.66	4.21
"	16,667	30,000	"	@ .20	3.33	7.54
"	30,000	60,000	"	@ .17	5.10	12.64
"	40,000	100,000	"	@ .14	5.60	18.24
"	100,000	200,000	"	@ .13	13.00	31.24
"	200,000	400,000	"	@ .12	24.00	55.24
"	600,000	1,000,000	"	@ .11	66.00	121.24
All over 1,000,000				@ .10		

The quarterly meter rates are as follows:

		Totals			Totals
First	3,500	gals.		2.00	
Next	6,000	9,500 "	@ .50	3.00	5.00
"	10,000	19,500 "	@ .30	3.00	8.00
"	10,500	30,000 "	@ .25	2.63	10.63
"	10,000	40,000 "	@ .20	2.00	12.63
"	50,000	90,000 "	@ .20	10.00	22.63
"	90,000	180,000 "	@ .17	15.30	37.93
"	120,000	300,000 "	@ .14	16.80	54.73
"	300,000	600,000 "	@ .13	39.00	93.73
"	600,000	1,200,000 "	@ .12	72.00	165.73
"	1,800,000	3,000,000 "	@ .11	198.00	363.73

No service charges are made on the monthly or quarterly meter schedules.

The Water Department installs all services free from the city main to the curb.

Both public and private fire hydrant rentals are $25.00 per month per hydrant.

Sprinkler charges for fire protection are:

4" connection	$25.00 per year
6" "	50.00 " "
8" "	100.00 " "

The above charges entitle the consumer to 600 sprinkler heads. All heads over 600 are charged at 5c per head per year.

ROY W. STRALEY,
Manager, Hanover Municipal Water Works.

Indianapolis, Ind.

Population	371,000
" served	360,000
Number of meters	72,157
" " hydrants	5,935
Miles of water main	659

The block meter rates are approved by the Public Service Commission of Indiana for the Indianapolis Water Co. The meter rates and the monthly minimum charges per meter are as follows:

Block Rate		Per Month Per 100 Cu. Ft.
First	500 cu. ft.	$0.25
Next	1,500 " "	.18
"	2,500 " "	.16
"	7,500 " "	.14
"	18,000 " "	.12
"	20,000 " "	.10
"	50,000 " "	.08
Over	100,000 " "	.06

Monthly Minimum Charge per Meter	
5/8" meter	$ 1.25
3/4" "	3.00
1" "	4.50
1 1/2" "	7.00
2" "	11.00
3" "	20.00
4" "	30.00
6" "	50.00

House service installations must be made by licensed plumbers approved by the company. When permits are granted, the company taps the mains for the applicant at its own expense, but the service pipe, cocks and other fixtures are installed by the plumber at the applicant's expense. Although original service lines are installed by and at the expense of the consumer, that portion lying between the water main and the property line is, if necessary, maintained or replaced by and at the expense of the company. The consumer is required to maintain all service lines within his property, and the company reserves the right to shut off the water at the curb and to keep it off until repairs are made in case there is waste of water in this section of the service. The minimum inside diameter of new service lines is 3/4-inch. In residential districts with lots having a frontage of from 50 to 100 feet or where the distance from the property line to the building served is 50 ft. or more, at least 1" pipe must be installed.

The company furnishes at its own expense and without charge to the consumer the meter yoke for holding the meter, as well as the meters for all services. The company requires a deposit of not more than $5.00 for each 5/8" meter supplying a single residence occupied by one family, unless the monthly consumption is in excess of the amount covered by the deposit. In other cases the company may increase the amount of the deposit to an amount not in excess of that accruing for an estimated 60-day service. Deposits for service applied through meters larger than 5/8" are estimated on the same basis for 60 days. Deposits bear interest at the rate of 3% payable upon the termination of service.

Public fire protection service is billed at $12.00 per year per fire hydrant, with an additional charge of 1.11c per inch-foot of water main.

No private fire protection service is furnished to any property unless general water service is also supplied to the same property. The rates for private fire protection service for use only in extinguishing fires are as follows:

For fire service from 2" line for standpipe	$20.00
" " " 3" " " "	45.00
" " " for automatic sprinkler service through first 4" line (maximum heads, 700)	60.00
For each additional 4" connection for same property	55.00
For fire service for automatic sprinkler service through 6" line	100.00
For private fire hydrant	60.00

H. S. MORSE,
Manager, Indianapolis Water Co.

Jonesboro, Ark.

Population	10,800
" served	12,000
Number of services	2,893
" " meters	2,893
" " hydrants	225
Miles of water main	54

The water rates effective November 15, 1932 are as follows:

First	3,000 gals. used per month	90c net
Next	10,000 " " " "	27c net per M gals.
"	40,000 " " " "	22 1/2c " " " "
"	50,000 " " " "	18c " " " "
"	100,000 " " " "	13 1/2c " " " "
"	100,000 " " " "	9c " " " "
All over	303,000 " " " "	8c " " " "

Minimum bill, 90c per month.

The charges for installation of services are $6.00 for 3/4" services and smaller, which includes the tap, service line and meter. Services larger than 3/4" are billed at cost less $6.00.

Public fire hydrants are furnished as free service, and private hydrants are metered.

The charges for sprinkler systems include the construction costs plus $75.00 per year for the first 1,000 heads, and 5c for each additional head per year.

LLOYD M. REBSAMEN,
Manager, City Water and Light Plant.

Manitowoc, Wis.

Population	23,750
" served	23,750
Number of services	4,812 active 1,721 inactive
" " meters	4,871
Number of hydrants	418
Miles of water main	63

The water rates are figured per 100 cubic feet of water used per month per meter and are as follows:

18c	for the first	5,000
16c	" " next	5,000
12c	" " "	5,000
8c	" " "	5,000
6c	" " "	5,000
4c	" all over	25,000

A 35-cent monthly minimum bill is required.

Applications for service must be made by the owner of a property or his authorized agent. Taps are made by the Water Department employees at a cost of $1.00 for taps of 1" and smaller. For taps of 4" and larger the consumer pays for all labor and materials necessary and an additional $5.00 for the use of the Department's machines for each tap made. The applicant must lay the service pipe from the street main into the premises at his own cost and supply all fittings according to the Department's specifications. No service pipe is permitted smaller than 5/8" inside diameter, and all services up to 1" must be of extra-heavy lead. All services must be provided with a shut-off ahead of the meter. No service connections or taps are permitted between December 1 and April 1 except in case of absolute necessity.

Both public and private fire hydrants are billed at $40.00 per year each. The installation expense of private hydrants must be borne by the consumer, and all hydrants are sealed. When necessary to break the seal for purposes of inspection, repair or in case of fire, notice must be supplied to the Water Department.

Sprinkler systems installed at the cost of the consumer are charged 5c per sprinkler head per year, with a minimum charge of $20.00 per year.

W. C. STAEFFLER,
Assistant Secretary, Public Utilities Commission

New Castle, Ind.

Population	20,000
" served	16,000
Number of services	3,921
" " meters	2,905
" " hydrants	208
Miles of water main	133

The commercial and domestic meter rate is as follows:

		Per 100 Cu. Ft. Gross	Net
First	2,000 cu. ft. used per quarter	$ .13	$ .12
Next	3,000 " " " "	.11	.10
"	5,000 " " " "	.10	.09
"	10,000 " " " "	.09	.08
"	30,000 " " " "	.08	.07
Over	50,000 " " " "	.065	.055

The net rate is charged if the account is paid on or before the 15th day of the month following the quarter in which service is rendered; otherwise the gross

rate is charged. The minimum quarterly charge for metered service is as follows:

	Gross	Net
½", ¾" or ¾" meter	$ 2.50	$ 2.25
1" "	4.75	4.50
1½" "	6.50	6.00
2" "	13.00	12.00
3" "	16.00	15.00
4" and over	52.00	50.00

Fire hydrants are billed at $40.00 each per year.

The special private fire protection rates are as follows:

	Per Year Gross	Net
1" attachment, for fire only	$ 10.00	$ 9.00
1½" " "	14.00	12.00
2" " "	27.00	24.00
3" " "	52.00	48.00
4" " "	100.00	96.00
6" " "	125.00	120.00

C. E. SCHOLL,
Superintendent.

Olympia, Wash.

Population	12,000
" served	12,300
Number of services	3,500
" " meters	3,500
" " hydrants	196
Miles of water main	36

The minimum charges per month on metered services within the city limits are as follows:

½" to ¾" meter inclusive	$ 1.00
1" meter	2.50
1¼" " to 2" meter inclusive	5.00
2½" " " 3" " "	7.50
3" " " 6" " "	10.00
8" "	20.00
10" "	30.00
12" "	50.00

DOMESTIC RATE—METERED, INSIDE CITY LIMITS
(as amended)

	Gals.	Rate	Total Cu. Ft.	Total Gals.	Total Amount
First 400 cu. ft.	3,000	.25	400	3,000	1.00
Next 400 " "	3,000	.25	800	6,000	2.00
" 400 " "	3,000	.24	1,200	9,000	2.96
" 400 " "	3,000	.22	1,600	12,000	3.84
" 400 " "	3,000	.20	2,000	15,000	4.64
" 1,000 " "	7,500	.19	3,000	22,500	6.54
" 1,000 " "	7,500	.18	4,000	30,000	8.34
" 1,000 " "	7,500	.16	5,000	37,500	9.94
" 10,000 " "	75,000	.15	15,000	112,500	24.94
" 10,000 " "	75,000	.11	25,000	187,500	35.94
" 10,000 " "	75,000	.10	35,000	262,500	45.94
" 15,000 " "	112,500	.08	50,000	375,000	57.94
" 50,000 " "	375,000	.07	100,000	750,000	92.94
" 50,000 " "	375,000	.06	150,000	1,125,000	122.94
All over 150,000 cu. ft.					$0.05 per 100 cu. ft.

COMMERCIAL RATE—METERED INSIDE CITY LIMITS

	Rate	Amount	Total Gals.	Total Amount
First 50,000 gals.	.20	$10.00	50,000	$10.00
Next 50,000 "	.18	9.00	100,000	19.00
" 100,000 "	.14	14.00	200,000	33.00
" 100,000 "	.10	10.00	300,000	43.00
" 100,000 "	.08	8.00	400,000	51.00
" 100,000 "	.07	7.00	500,000	58.00
" 500,000 "	.06	30.00	1,000,000	88.00

All over this amount through one meter in a month, 5c per 1,000 gals.

METER RATES OUTSIDE THE CITY LIMITS

Minimum charge, 400 cu. ft. or less $1.25

	Gals.	Rate	Total Cu. Ft.	Total Gals.	Total Amount
Next 200 cu. ft.	1,500	.30	600	4,500	$1.85
" 400 " "	3,000	.28	1,000	7,500	2.97
" 300 " "	2,250	.26	1,300	9,750	3.75
" 1,000 " "	7,500	.24	2,300	17,250	6.15
" 1,000 " "	7,500	.22	3,300	24,750	8.35

Services are installed at the expense of the property owner by the city, which charges the actual cost of the work. The property owner in applying for a service is required to make a deposit of $10.00 to cover the estimated expenses for the installment. The services are constructed by the city as far as the property line, where a suitable curb cock is installed by the city at the expense of the property owner. Where it is necessary to open a paved street, the actual cost of labor and material and laying such a service and replacing the pavement is charged. In cases of connections extending along a street on which there is no main, the cost of material and labor is estimated by the superintendent and the estimated cost is paid by the person applying for the service before the work of connecting the property with the main is begun, provided that whenever the estimated cost is not sufficient to cover the total expense for labor and materials, the deficit is charged to the property for which the installation is made.

The city current expense fund pays to the Water Department $20.00 per year for each fire hydrant, $24.00 for flush tanks for flushing sewers, and $320.00 per year for each street pressure flushing truck for the washing of paved streets.

All factories and other buildings with automatic sprinkler systems connected to the city water main are required to pay to the Water Department quarterly the following rates:

6" connection or under, per quarter	$12.50
8" " " " " "	25.00
10" " " " " "	50.00
12" " " " " "	100.00

CHARLES H. WILLIAMS,
City Engineer and Water Superintendent.

Rapid City, S. Dak.

Population	11,000
" served	11,000
Number of services	2,305
" " meters	2,260
" " hydrants	187
Miles of water main	31.5

All water consumed in one quarter less than 40,000 cu. ft. is billed as follows:

First 1,200 cu. ft. $3.00 minimum charge
All in excess of 1,200 cu. ft. at 7.5c per 100 cu. ft.
Consumption in excess o 40,000 cu. ft. per quarter, 7.5c per 100 cu. ft.

All services are installed by plumbers who make the application, and the work is done at the expense of the consumer.

Hydrants used by the city are billed at $25.00 per year per hydrant. There is no charge for private hydrants where they are installed by private parties, but all water used is billed at the regular meter rates.

There are no extra charges for sprinkler installations, but all water used is billed at the regular meter rates.

E. M. SNECKENBERGER,
City Manager.

Rochester, Minn.

Population	20,600
" served	20,000
Number of services	4,250
" " meters	4,200
" " hydrants	445
Miles of water main	46.6

Water rates are divided into quarterly and monthly rates for domestic and industrial services respectively. The rates are as follows:

QUARTERLY WATER RATES

Minimum bill, $1.50
25c per 100 cu. ft. for first 6,000 cu. ft.
15c " " " " " next " " "
10c " " " " " all in excess
Less 10% discount if paid within 10 days from date of bill.

No discount on minimum bill.

MONTHLY WATER RATES

Minimum bill, 50c
25c per 100 cu. ft. for first 2,000 cu. ft.
15c " " " " " next " " "
10c " " " " " all in excess
Less 10% discount if paid within 10 days from date of bill.

No discount on minimum bill.

Minimum bills on all services connected to the city system in excess of 1" meters shall be as follows:

1½"	$3.50 monthly,	$10.50 quarterly
2"	5.70 "	17.00 "
3"	11.35 "	34.00 "
4"	22.00 "	68.00 "
6"	45.35 "	136.00 "

Services are laid by licensed plumbers under the supervision of the Water Department, the taps being made by the Department at $2.50 for a ¾" tap and $3.00 for a 1" tap. Service materials such as corporation and curb stops, copper tubing and all brass connections, as well as curb boxes, are kept in stock by the Water Department and sold to the plumber practically at cost to assure the property owner, who pays for the service, as well as the Water Department, a standardized service material known to be satisfactory.

The city charter provides for a so-called hydrant rental of $75.00 for every 1,000 feet of mains laid.

EUGENE SCHWARTZ,
Superintendent, City Water Department.

Salt Lake City, Utah

Population	142,000
" served	150,000
Number of services	28,821
" " water meters	27,336
" " hydrants	2,683
Miles of water main	362

Within the city the meter rates are as tabulated below, with a minimum monthly charge of 0.66 2/3c, or a quarterly charge of $2.00.

	Monthly	Quarterly
7.3c per 100 cu. ft. for first	13,000	39,000
6.6c " " " " " next	13,000	39,000
6c " " " " " over	26,000	78,000

AMERICA LEADS IN TELEPHONE SERVICE

THE telephone was invented in this country and it has reached its highest development here. There are six times as many telephones in relation to population in the United States as in Europe and the service is better.

This high efficiency did not just happen. It is the result of American initiative and a sincere desire to serve the public. Back of it all you see the value of the structure and the fundamental policies of the Bell System.

This system functions in the best interests of the telephone user because it combines and unifies the essentials of efficient telephone communication—research, engineering, manufacture, supply and operation. There is no pulling at cross-purposes or waste through an overlapping of activities. Everything is co-ordinated to give you the best telephone service at the lowest possible cost.

The general plan of the Bell System is the cumulation of more than fifty years' experience, resulting in one policy, one system and universal service.

BELL TELEPHONE SYSTEM

Outside the city the rate is $2.00 per month minimum, and the water is billed at 20c per 100 cu. ft. for all over the minimum.

The consumer pays for the cost of installation of the service, but not for the meter on a 5/8" service. On a 1" service, the difference in cost between a 1" and a 5/8" meter is charged to the consumer, in addition to the cost of the service. On all sizes over 1", the consumer pays the entire cost of the service and the meter. All applications for services must be made by licensed plumbers, who are under bond.

There is no charge for the municipal use of hydrants. The charge for private use is $4.00 for a permit, plus $1 per day as long as the public fire hydrant is used to supply water for a private service such as construction.

There is no charge for automatic sprinklers. The installation is billed at the actual cost of service, and water is charged at the regular meter rates.

H. K. Burton,
Superintendent of Water Works.

Washington, D. C.

Population	495,000
" served	495,000
Number of services	100,101
" " meters	88,361
" " hydrants	5,587
Miles of water main	864.22

A minimum rate of $8.75 per year in advance is charged all consumers supplied with water through meters. This allows the use of 7,500 cu. ft. of water during the year. Water used in excess of this quantity is charged for at the rate of 7c per 100 cu. ft. Water meters are required for all manufacturing establishments, hotels, swimming baths, bottling establishments, gas tanks, railroad yards, steamboats and wharves, brick yards and other places requiring a large quantity, including all premises using fountains or automatic fixtures, and on all premises supplied through a water service of such size as to require a meter larger than a standard 5/8" meter, and all premises for business purposes on which the water rent according to the schedule of flat rates is $25.00 or more per year.

D. W. Holton,
Superintendent, Water Department.

Wilmington, Del.

Population	106,000
" served	110,000
Number of services	26,608
" " meters	25,634
" " hydrants	1,233
Miles of water main	169.9

There is a minimum charge applied to property supplied through various sizes of meters.

In the case of the 5/8" meter, the rate applies except for those properties which do not have over two 1/2" outlets, in which case a minimum of $6.00 a year is charged, for which amount 1,667 cubic feet of water per quarter is allowed. The minimum charges are as follows:

5/8" meter	$12.00
3/4" "	18.00
1" "	24.00
1 1/2" "	36.00
2" meter	48.00
3" "	60.00
4" "	72.00
6" "	96.00
8" "	180.00
10" "	300.00

Rates for Water Consumed, by Meter Measurements

First 2,000 cu. ft. or less, per quarter at 90c per 1,000 cu. ft.
Next 3,000 cu. ft. or less, per quarter at 72c per 1,000 cu. ft.
All over 5,000 cu. ft., per quar. at 66c per 1,000 cu. ft.

First 2,000 cu. ft. or less, per quarter at	90c	per 1,000 cu. ft.
Next 5,000 " " " " " "	72c	" " " "
All over 5,000 cu. ft., per quarter at	66c	" " " "

Services are installed by and at the expense of the Water Department from the main to the curb line.

No rentals are charged to the city for the public fire hydrants. The original installation of any sprinklers for private fire protection within the city is entirely at the expense of the owner, and there are no further rental charges but all such services are metered.

W. Compton Wills,
Chief Engineer, Water Department.

Winona, Minn.

Population	20,850
" served	19,182
Number of services	5,093
" " meters	4,909
" " hydrants	496
Miles of water main	47.57

The following rates are charged for water supplied through meters per month:

For 5,000 gals. or less per month at the rate per 1,000 gals. of	$ .30
For all water used in excess of 5,000 gals. and less than 10,000 gals. per month, at the rate per 1,000 gals. of	.23
For all water used in excess of 10,000 gals. and less than 15,000 gals. per month, at the rate per 1,000 gals. of	.15
For all water used in excess of 15,000 gals. and less than 150,000 gals. per month, at the rate per 1,000 gals. of	.12
For all water used in excess of 150,000 gals. per month, at the rate per 1,000 gals. of	.09

Churches, charitable and educational institutions are allowed a 30% discount on the regular meter rates, but the following minimum charges are collected in all cases:

For 5/8" meter, per month	$ .75
" 3/4" " " "	1.00
" 1" " " "	1.50
" 1 1/2" " " "	2.50
" 2" " " "	3.50
" 3" " " "	4.50
" 4" " " "	5.50
" 6" " " "	8.00
" 8" " " "	10.50
" 10" " " "	13.50

The foregoing rates are subject to a discount of 10% if paid within 30 days of billing. In addition to the foregoing rates and minimum charges the following monthly rentals are collected on all meters 3" and larger for a period of 10 years of active service after the date of installation of the meter.

Rental for 3" meter, per month	$ 1.35
" " 4" " " "	2.00
" " 6" " " "	4.00
" " 6" " " "	6.50
" " 10" " " "	8.00

Application for permission to lay water pipe must be made to the Board of Municipal Works by a licensed plumber as agent for the prospective consumer. When the application is approved, a permit is issued upon receipt of the price of the corporation cock and lead connection required, and the tap is made under the immediate direction of the Secretary of the Board of Municipal Works. No tap above the size 5/8" inside diameter is permitted except by special dispensation. Within 48 hours after laying any service pipe and making a connection, the plumber doing the work is required to file with the Board a complete report showing by description and diagram the exact location of the tap and service pipe, the block in which the premises are located, and the street bounding it, and other data to definitely locate the service.

There are no hydrant rental charges and no sprinkler charges.

Henry Magnus,
Secretary, Board of Municipal Works.

Wausau, Wis.

Population	23,758
" served	22,000
Number of services	4,794
" " meters	4,379
" " hydrants	395
Miles of water main	64.98

The water rates are as follows:

First	1,000 cu. ft.	20c per 100 cu. ft.
Next	3,000 " "	15c " " " "
"	6,000 " "	10c " " " "
"	15,000 " "	8c " " " "
"	35,000 " "	7c " " " "
All over	60,000 " "	6c " " " "

Emil Flatter,
Superintendent, Wausau Water Works.

Yonkers, N. Y.

Population	141,600
" served	141,600
Number of services	17,960
" " meters	17,933
" " hydrants	2,951
Miles of water main	255.89

The domestic rate for water by meters is 16c per 100 cu. ft., and the minimum rate per quarter is $2.00, permitting the use of 1,250 cu. ft. of water. The industrial rate for mechanical purposes is 10c per 100 cu. ft. The deposits on frozen meters to cover the cost of repairs, are $5.00 for a 5/8" meter, $7.00 for a 3/4" meter, and $10.00 for a 1" meter. When actual costs have been ascertained, the balance is returned to the depositor.

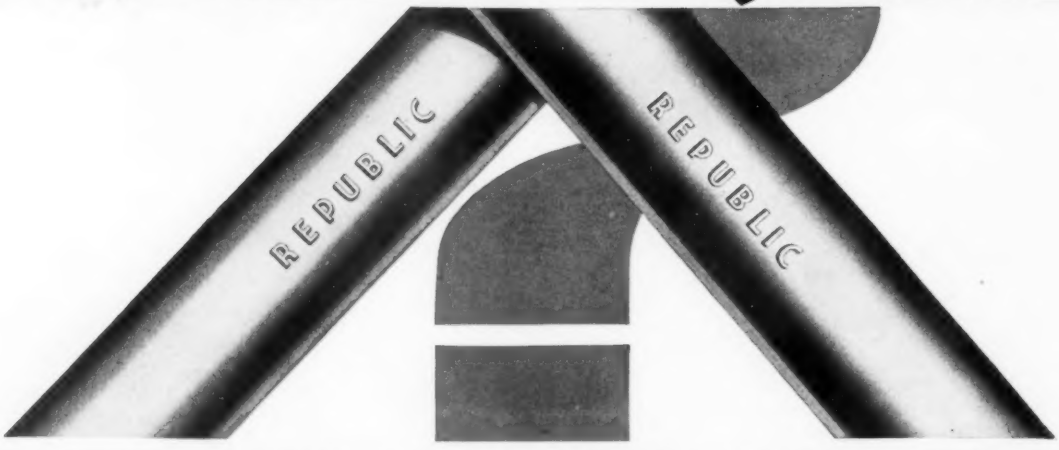
Section 8, Article VIII, of the Supplemental Charter, as amended in 1918, requires the payment of a frontage tax of 5c a front foot in each and every year on all real estate lying along or facing on either side of a street or alley in which a water main is laid, or is laid in the future. This frontage tax is in addition to the regular water-meter rates.

A deposit of $50.00 is required of any contractor for the use of a hydrant during the summer months, and $100.00 in the winter months. There is also a charge of $5.00 for inspection plus the cost of water actually used at 16c per 100 cu. ft.

There is no charge for sprinklers for private fire protection.

A. H. Tompkins, Jr.,
Chief Clerk.

THERE CAN BE NO QUESTION



TONCAN IRON PIPE DOES LAST LONGER

Records of the service given by Toncan Iron Pipe in every type of installation prove conclusively that this modern alloy pipe does last longer. This statement holds true whether it is used in a plumbing or heating system in a building, in process lines in industrial plants, for supply and drainage lines on board ship, or carrying acid mine water far underground.

In the latest edition of "Pipe for Permanence" you will find the records of many comparative tests. And you will also find the technical information that explains why Toncan Iron Pipe consistently renders better service than other ferrous pipe slightly lower in cost.

Toncan Iron Pipe is the only pipe obtainable today that takes advantage of the properties of refined iron, copper and molybdenum to form an alloy that is rust-resisting to a higher degree than any other ferrous material, except the stainless alloys. It is the only pipe that combines with this rust-resisting feature the many advantages that Republic's Electric Weld Process alone can claim—100% perfect weld, straightness, roundness, uniform wall thickness, freedom from inside defects and absence of scale inside and out.

Every pipe buyer should know the facts. A copy of "Pipe for Permanence" will be sent on request.

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IRON PIPE

REPUBLIC STEEL CORPORATION

GENERAL OFFICES YOUNGSTOWN, OHIO

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IMPROVING MUNICIPAL ADMINISTRATION

Current Items from the Public Administration Clearing House

Salary Trends of Officials

AMERICAN cities of over 30,000 population are paying their mayors from $2,317 to $14,300 this year, averaged according to population class. City managers are getting from $5,865 to $13,800.

Salaries of the mayors, city managers and fifteen other department heads were reduced about 14 per cent between January, 1930, and January, 1934, according to figures appearing in The Municipal Year Book, published by the International City Managers' Association. Since the first of this year, however, many cities have restored part or all of the salary cuts.

Study of the salary trends during the past four years shows that small cities have cut salaries more drastically than the larger ones. The average reduction for all officials in cities of over 500,000 population was 2.1 per cent. In cities of less than 30,000, the reduction was about 18 per cent.

On January 1, 1934, salary averages for various municipal positions ranged from cities of 30,000-50,000 population to those over 500,000 as follows:

City Clerk, $2,456 to $6,365; city attorney, $2,678 to $10,655; director of finance, $2,496 to $9,814; chief accounting officer, $2,537 to $6,688; city assessor, $2,335 to $5,117; city treasurer, $2,143 to $7,949; purchasing agent, $2,066 to $7,304; health officer, $2,075 to $8,305; fire chief, $2,514 to $6,817; police chief, $2,636 to $7,203; city engineer, $2,873 to $7,686; director of public works, $2,641 to $8,235; director of public welfare, $2,141 to $6,698; superintendent of schools, $5,283 to $11,737; librarian, $2,119 to $6,428.

The average length of service of municipal officials is approximately 7 years, according to the Year Book. Librarians hold the honor of longest tenure, with an average of 12 years. Fire chiefs are second, with an average tenure of 9.6 years. School superintendents average 9 years. City engineers average 8 years.

Making Government Simpler

SIMPLIFICATION of government within the great metropolitan areas of the country is unquestionably on its way, according to Robert M. Paige, Secretary, Governmental Research Association.

In support of this statement, Mr. Paige cites plans for the complete reorganization of the Los Angeles area now being studied by the Committee on Governmental Simplification appointed by county authorities. One plan under consideration here provides for greater use of the contract system by which some Los Angeles County cities now arrange with the county for health service, tax collection and tax assessing.

Under this system cities and villages would make contract with the county for still other services, paying for them on a cost basis. Cities taking advantage of the scheme would get rid of many bureaus and departments, receiving services from the large county organizations at a lower cost than they can now provide them.

Chicago citizens on April 10, 1934, voted consolidation of the 22 park districts of the city and the placing of all parks under one board. This is another important step toward simplification of government in the metropolitan area. Cook County, in which Chicago is located, has more than 400 governments.

Cleveland and Toledo are two of the Ohio cities which have appointed committees to study various types of metropolitan consolidation, as permitted by the new County Home Rule Amendment to the state constitution. In Cleveland at the next regular election voters will choose a commission to draft a county charter, which will provide a framework for developing a unified government for this metropolitan commmunity. A county charter is also being drafted in Cincinnati.

In Milwaukee both the City Council and the County Board of Supervisors have appointed committees to prepare plans for simplifying the governmental set-up of that area.

Tax-Anticipation Scrip Shows Up Best

TAX-ANTICIPATION scrip, used by many cities of the country as an emergency source of credit, has been the most successful of the municipal substitutes for cash, according to a report completed last month by the American Municipal Association and the Municipal Finance Officers' Association.

At least nine cities are still using it. These include Detroit, Flint, Grand Rapids and Royal Oak, Mich., Milwaukee, Dayton, Atlantic City, Birmingham and Knoxville.

In most cases, the survey of some 80 cities shows, scrip was used to pay employees and to buy supplies. Most cities, also, accepted it for taxes, particularly for delinquent taxes.

Flint, Mich., issued scrip as recently as April 1 of this year, to pay in part the general city and water department employees. Delinquent taxes and pledges of the city's full faith and credit stand behind the general scrip. Water revenues back the water fund scrip.

The report suggests certain restrictions upon tax-anticipation scrip to make it entirely successful. In the first place, it points out that scrip should be considered only as a last resort, since it offers no permanent solution of financial difficulties.

Safeguards cities should take are: (1) to make certain the amount of scrip issued does not exceed the maximum permitted by law and is based on a conservative estimate of future tax collections; (2) to make the scrip payable to "bearer"; (3) to set a reasonable interest rate—say, 4 per cent; (4) to set a definite maturity date, thus avoiding discounting; (5) to pledge taxes for security, collections of which should be put aside in a trust fund.

The scrip should be acceptable for taxes, at least for those taxes against which it is issued. The use of it to pay delinquent taxes should be encouraged, the report comments. Ocean City, N. J., follows this plan, accepting scrip at a premium of one per cent if it is applied to taxes within two months after issuance.

City Reporting Improves

BANGOR and Berkeley citizens know where their money goes.

These two cities, among others of the country, issue pamphlets supplementing their annual reports which translate the spending of tax dollars into terms citizen readers can understand, says Clarence E. Ridley, Executive Director, International City Managers' Association.

"Berkeley City Affairs" points out that that the city's crime rate for 1933 was 11 per cent lower than the average for 80 like-size cities, and its fire loss the lowest in 17 years. This kind of government, the booklet says, costs each citizen 3½ cents a day.

A pamphlet put out by the city of Bangor, Maine, "Who Pays the Taxes and Who Makes the Complaints," presents the tax-bill and the expenditure for services for Mr. Average Taxpayer—head of a family of five—who pays $94.90 to the city in 1934.

"Reporting of cities' business is getting better," Mr. Ridley comments. "The reason is that through the depression citizens have become as much interested in their cities' accomplishments as stockholders are in the market page.

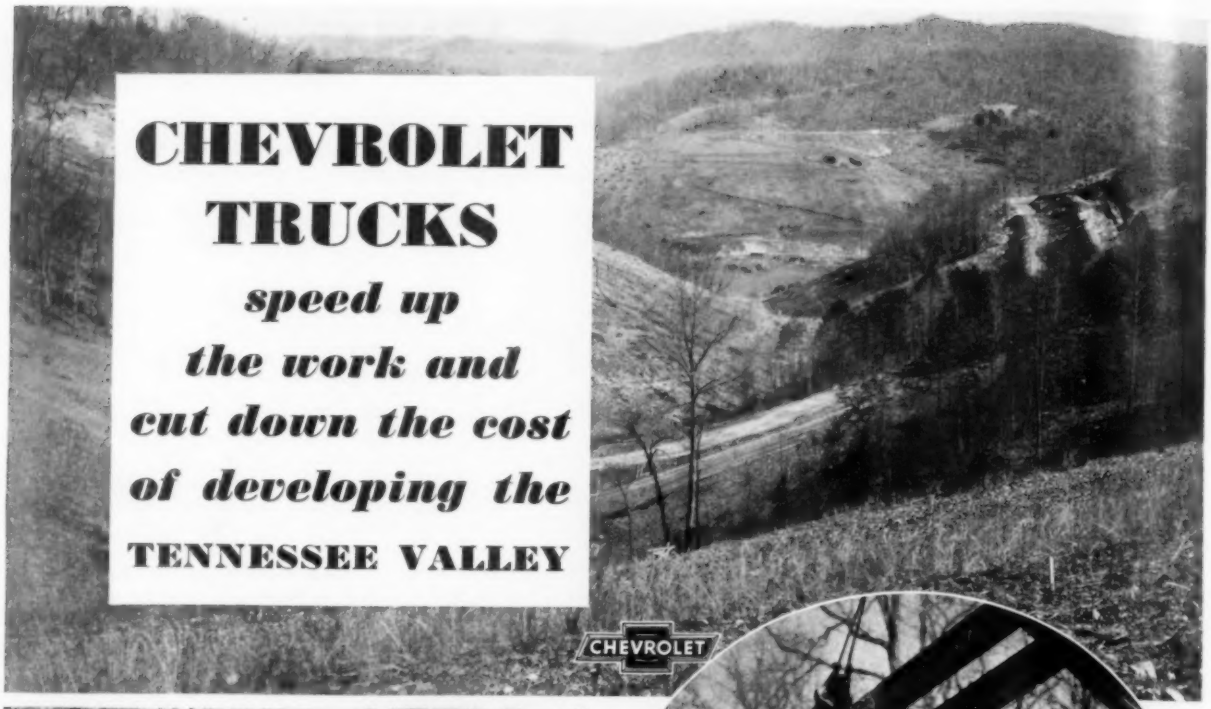
"Municipal reports of 1933 now just coming out show an improvement. Not only are these records kept within a length readable at one sitting, but they are in many cases made interesting by photographs of civic improvements due to CWA and other outlay."

To be effective, a good annual report must have at least six qualifications, according to Mr. Ridley. It must be brief, prompt, attractive, accurate, and contain comparative data; it must also be free from self-aggrandizement.

CHEVROLET TRUCKS

speed up the work and cut down the cost of developing the

TENNESSEE VALLEY



Backed in, loaded and away, with minimum loss of time. Chevrolet trucks keep work from lagging on remote operations.

Extra top boards for a bigger load, but Chevrolet trucks have plenty of pulling power—the lowest final gear ratio (axle and transmission combined) of any 1½-ton truck.

Heavy going after hard rains, but Chevrolet trucks keep the loads moving. Chevrolet heavy duty rear axles—straddle-mounted pinion, 4-pinion differential, and oversize axle shafts—can "take it."

Chevrolet "pick-ups" save time on any project—always dependable, always fast, for hauling tools and light loads.

Uses for Chevrolet stake trucks are endless. They handle big loads and save time on loading and unloading. Records show you can't beat the economy of Chevrolet trucks—the world's lowest-priced Sixes.

Future Requirements for Residential Development

By LAWRENCE M. ORTON
General Secretary,
Regional Plan Association,
New York City

TO aid in promoting the orderly and spacious growth of New York City and its environs, the Regional Plan Association has made a special analysis of future requirements for new residential development in the New York Region, looking forward to an estimated population of about 16,000,000.

The Region, shown in the accompanying map, covers 5,528 square miles, of which only 7 per cent is now devoted to close residential use. The analysis, made under the direction of Harold M. Lewis, Engineer of the Association, shows that an additional 14 per cent, or 754 square miles, is available and suitable for such use, but that less than a third of this land still available is likely ever to be required for residence.

New residential construction is virtually at a standstill. The return of prosperity may bring a new period of speculation and inflated land values. Now, before this happens, is the crucial time to take stock of the situation and determine the probable future requirements of vacant land for actual development. Drastic measures may be needed to prevent effectively a repetition of the disastrous cycle.

The following are some of the striking facts and conclusions brought out in the analysis:

The maximum intensity of residential use is within five miles of the City Hall in Manhattan. In this circle 50 per cent of the total area is used primarily for residence. Here also is an average of 118 persons per acre as compared with an average of 43 persons per acre of residential area for the entire Region.

About 59 per cent of the total population of the New York Region lives within 10 miles of City Hall.

A continued decentralization of population is indicated by the estimate that the greatest rate of growth in the future will take place between the 10- and 15-mile circles.

The highest average density in any 5-mile area beyond the 15-mile circle is 24 persons per acre.

It is expected that the average density for the Region will drop—from 43 to 41 persons per acre of residential area—owing to decreases of congestion in the central areas of Manhattan.

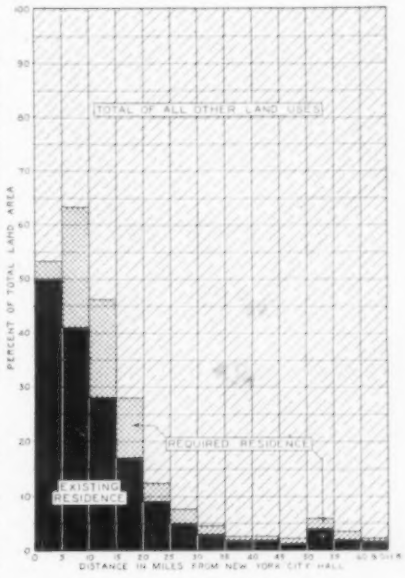
Only about 210 square miles, or 28.2 per cent, of the 754 square miles of new areas available and suitable for residential expansion are likely to be needed for that purpose.

Subdivision of vacant land in excess or advance of its need for residential use should be prevented.

The real problem in residential development is its limitation in conformity with the comprehensive plan for the Region.

A desirable standard of maximum densities would be 200 persons per acre in central areas, decreasing to 20 persons per acre in the outer Region.

There is obviously plenty of space in the Region to take care of any future residential requirements. There is also a great abundance of space for all other types of development which are likely to arise within New York and its environs. Even with a total population of 16,000,000 adequately housed with reasonable standards of public open space and with ample space for business and industrial expansion, 76 per cent or three-quarters of the land area would still be left available for all other uses. Within this will be ample room for agriculture, forestry, golf and country clubs, private estates, airports, institutions and other uses which require little it any building development. Proper planning and protection of these areas is an important problem in city and regional planning.


TOTAL OF ALL OTHER LAND USES
REQUIRED RESIDENCE
EXISTING RESIDENCE
PERCENT OF TOTAL LAND AREA
DISTANCE IN MILES FROM NEW YORK CITY HALL

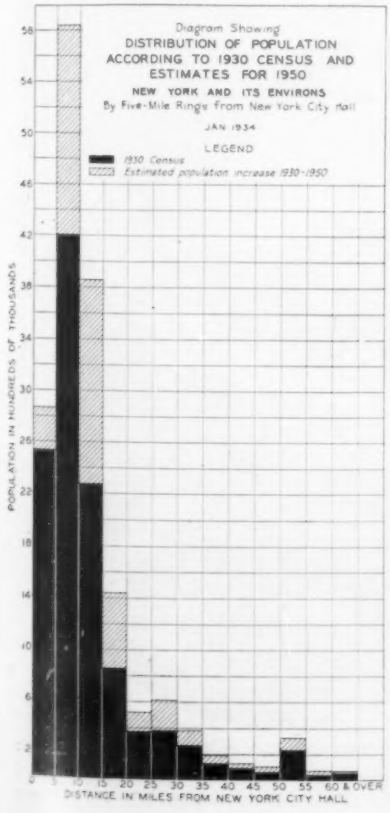
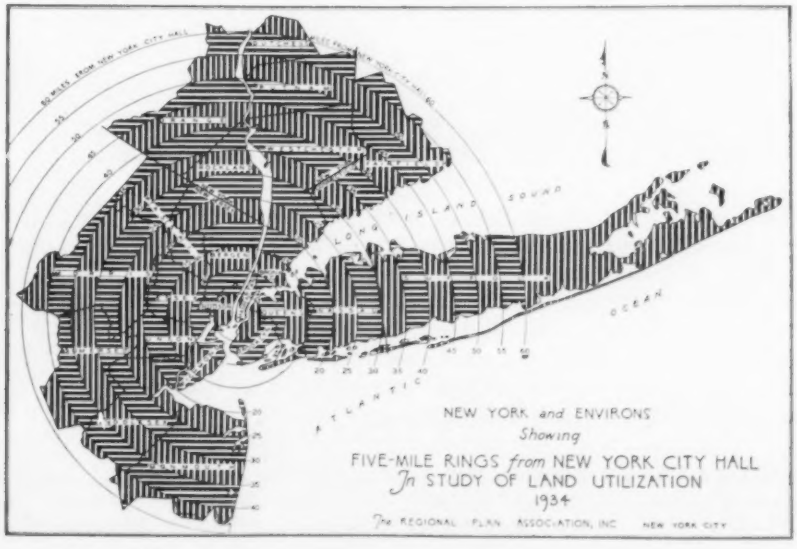
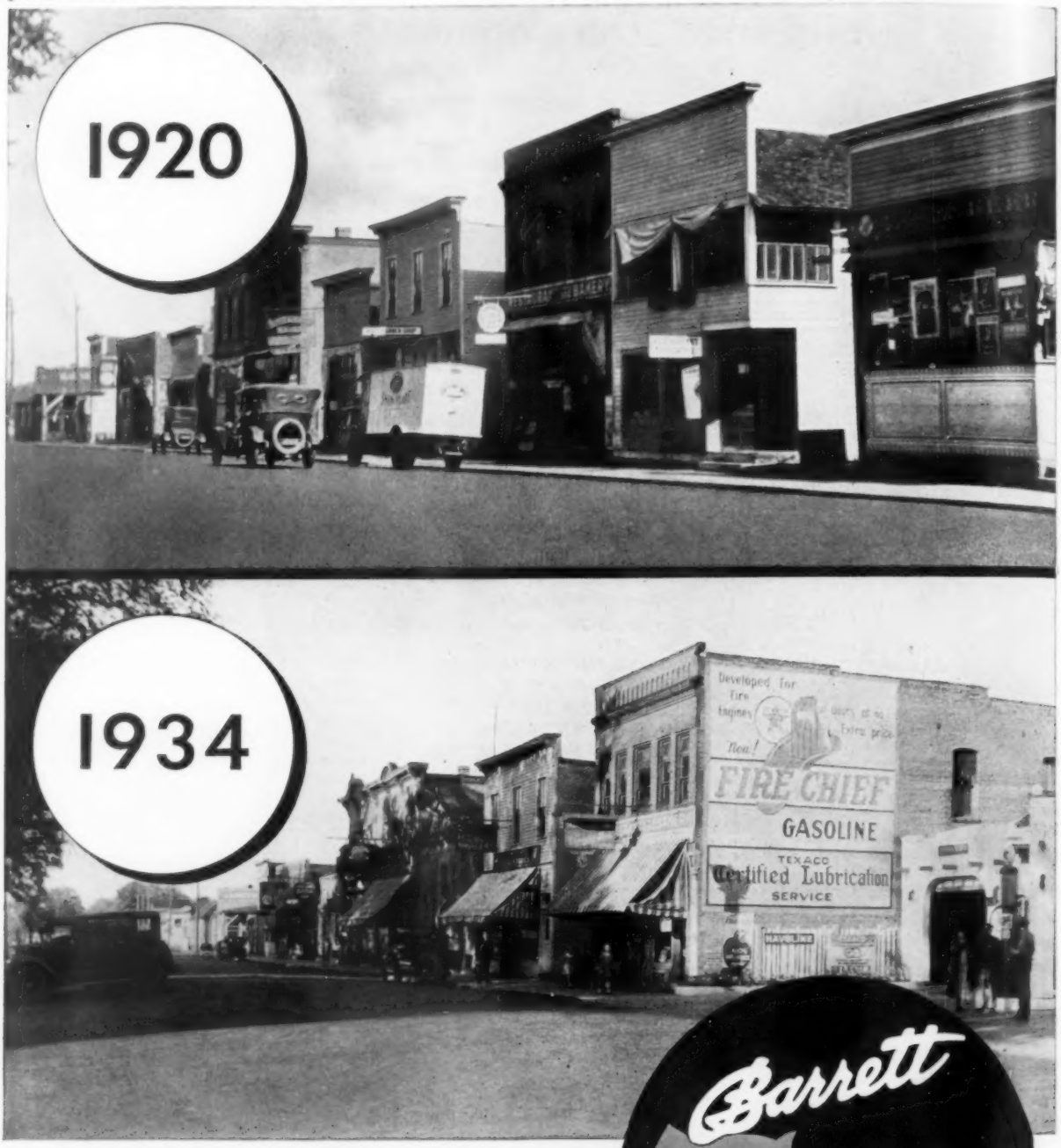


Diagram Showing
DISTRIBUTION OF POPULATION
ACCORDING TO 1930 CENSUS AND
ESTIMATES FOR 1950
NEW YORK AND ITS ENVIRONS
By Five-Mile Rings from New York City Hall
JAN 1934
LEGEND
1930 Census
Estimated population increase 1930-1950
POPULATION IN HUNDREDS OF THOUSANDS
DISTANCE IN MILES FROM NEW YORK CITY HALL


NEW YORK and ENVIRONS
Showing
FIVE-MILE RINGS from NEW YORK CITY HALL
In STUDY OF LAND UTILIZATION
1934
The REGIONAL PLAN ASSOCIATION, INC. NEW YORK CITY

Railroad Avenue, White Bear, Minnesota, Tarvia-built in 1920. The modern gasoline filling station which has supplanted the old "false-front" frame buildings is typical of the changes in American towns and villages since this pavement was put in service.



● Railroad Avenue's fourteen years of uninterrupted service tells you, as well as anything could, why Tarvia belongs in your road program. Long-lived Tarvia roads are not exceptional. Highway officials all over the country have had similar experiences with Tarvia. They know that a Tarvia pavement needs only the simplest and most inexpensive maintenance to make it last indefinitely—always smooth, easy-riding, skid-safe.

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GOOD ROADS AT LOW COST

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New York Chicago Birmingham Philadelphia Minneapolis Boston Cleveland Detroit St. Louis Buffalo Lebanon Baltimore Providence Bethlehem Columbus Syracuse Rochester Youngstown Hartford Milwaukee Toledo Cincinnati Portland, Me. In Canada: THE BARRETT COMPANY, LTD. Montreal Toronto Winnipeg Vancouver

Mention THE AMERICAN CITY—it helps.

Financial Statistics of Cities

New Figures Just Released from Washington

THE Bureau of the Census, Department of Commerce, has made the following summary of the financial transactions of the 94 cities having a population of over 100,000 for the fiscal year 1932. These statistics cover the government of the city corporation proper, and also independent school districts, sanitary districts, park districts and other independent districts practically coextensive with the cities. They include also a per cent of the financial transactions, debt and tax levies of the county government for cities having over 300,000 population in order that the statistics for such cities may be comparable with those for other cities in this class in which the ordinary county functions are performed by the city government.

The payments for operation and maintenance of the general departments of the city governments of the 94 cities for the fiscal period 1932 amounted to $1,806,516,780 (analyzed below), or $47.87 per capita. In 1931 the comparative per capita for operation and maintenance of general departments was $49.65, and in 1917, $20.68. Payments for the operation of public service enterprises as water works, electric light plants, and similar enterprises amounted to $124,744,856; interest on debt, $354,731,245; and outlays for permanent improvements, including those for public service enterprises, $556,628,424. The total payments in 1932, therefore, were $2,842,621,305; in 1931 they were $3,114,193,084, and in 1917, $911,369,306.

The totals include all governmental-cost payments for the year, whether made from current revenues or from the proceeds of bond issues. Proceeds from the issuance of debt obligations are not considered to be revenue receipts.

Of the total payments in 1932, 63.6 per cent was for operation and maintenance of general departments, 4.4 cent, operation and maintenance of public service enterprises, 12.5 per cent, interest on debt; and 19.6 per cent, outlays for permanent improvements.

The total revenue receipts of the 94 cities in 1932 were $2,596,856,581, or $68.82 per capita. This was $310,863,700 more than the total payments of the year exclusive of the payments for permanent improvements, but $245,764,724 less than the total payments including those for permanent improvements. The revenue receipts included $1,719,472,191 from general property taxes; $29,341,025 from special taxes; $90,500,834 from licenses; $101,850,966 from special assessments; $220,535,159 from subventions, donations, and pension assessments; $111,013,270 from interest, rents, and highway privileges; $242,429,531 from earnings of public service enterprises; $70,093,803 from earnings of general departments; and $11,619,802, the remainder, from poll taxes, fines, forfeits and escheats.

The net indebtedness (funded or fixed debt less sinking-fund assets) of the 94 cities amounted to $6,289,078,671, or $166.66 per capita.

The assessed valuation of property subject to ad valorem taxation for city purposes was $66,186,377,608 for the 94 cities, and the amount of taxes levied for the city government was $1,931,089,583, or $51.18 per capita.

GOVERNMENTAL-COST PAYMENTS FOR OPERATION AND MAINTENANCE OF GENERAL DEPARTMENTS OF MUNICIPALITIES: 1932. (OTHER THAN FOR PUBLIC SERVICE ENTERPRISES)

	Group I Cities of 500,000 and over	Group II Cities of 300,000 to 500,000	Group III Cities of 100,000 to 300,000
All general departments	$1,174,258,621	$253,766,467	$378,491,692
Per capita	54.25	49.56	34.50
General government	108,047,304	21,766,649	20,095,060
Per capita	4.99	4.25	1.83
Per cent of total	9.2	8.6	5.3
Protection to person and property	213,175,611	44,290,338	71,331,579
Per capita	9.85	8.65	6.50
Per cent of total	18.2	17.5	18.8
Conservation of health	25,938,851	7,382,927	8,723,004
Per capita	1.20	1.44	0.80
Per cent of total	2.2	2.9	2.3
Sanitation	83,290,531	13,784,197	20,890,458
Per capita	3.85	2.69	1.90
Per cent of total	7.1	5.4	5.5
Highways	78,996,376	21,356,504	27,317,491
Per capita	3.65	4.17	2.49
Per cent of total	6.7	8.4	7.2
Charities, hospitals and corrections	157,291,229	38,326,405	38,801,617
Per capita	7.27	7.48	3.54
Per cent of total	13.4	15.1	10.3
Schools	369,014,325	81,994,190	156,081,620
Per capita	17.05	16.01	14.23
Per cent of total	31.4	32.3	41.2
Libraries	12,678,547	3,590,326	5,993,731
Per capita	0.59	0.70	0.55
Per cent of total	1.1	1.4	1.6
Recreation	42,448,724	8,680,860	11,987,073
Per capita	1.96	1.70	1.09
Per cent of total	3.6	3.4	3.2
Miscellaneous	83,377,123	12,594,071	17,270,059
Per capita	3.85	2.46	1.57
Per cent of total	7.1	5.0	4.6

Totals for all three groups of cities: All general departments, $1,806,516,780; General government, $149,909,013; Protection to person and property, $328,797,528; Conservation of health, $42,044,782; Sanitation, $117,965,186; Highways, $127,670,371; Charities, hospitals, and corrections, $234,419,251; Schools, $607,090,135; Libraries, $22,262,604; Recreation, $63,116,657; Miscellaneous, $113,241,253. Population, 37, 734,912.

ASSESSED VALUATIONS, PER CAPITA LEVIES, AND NET DEBTS: 1932

	Group I	Group II	Group III
Per capita levy of general property tax for government of city	$ 60.41	$ 47.41	$ 34.72
Net debt at close of year	4,244,319,420	807,216,447	1,237,542,804
Per capita net debt	196.10	157.63	112.81
Estimated population	21,643,700	5,120,900	10,970,312

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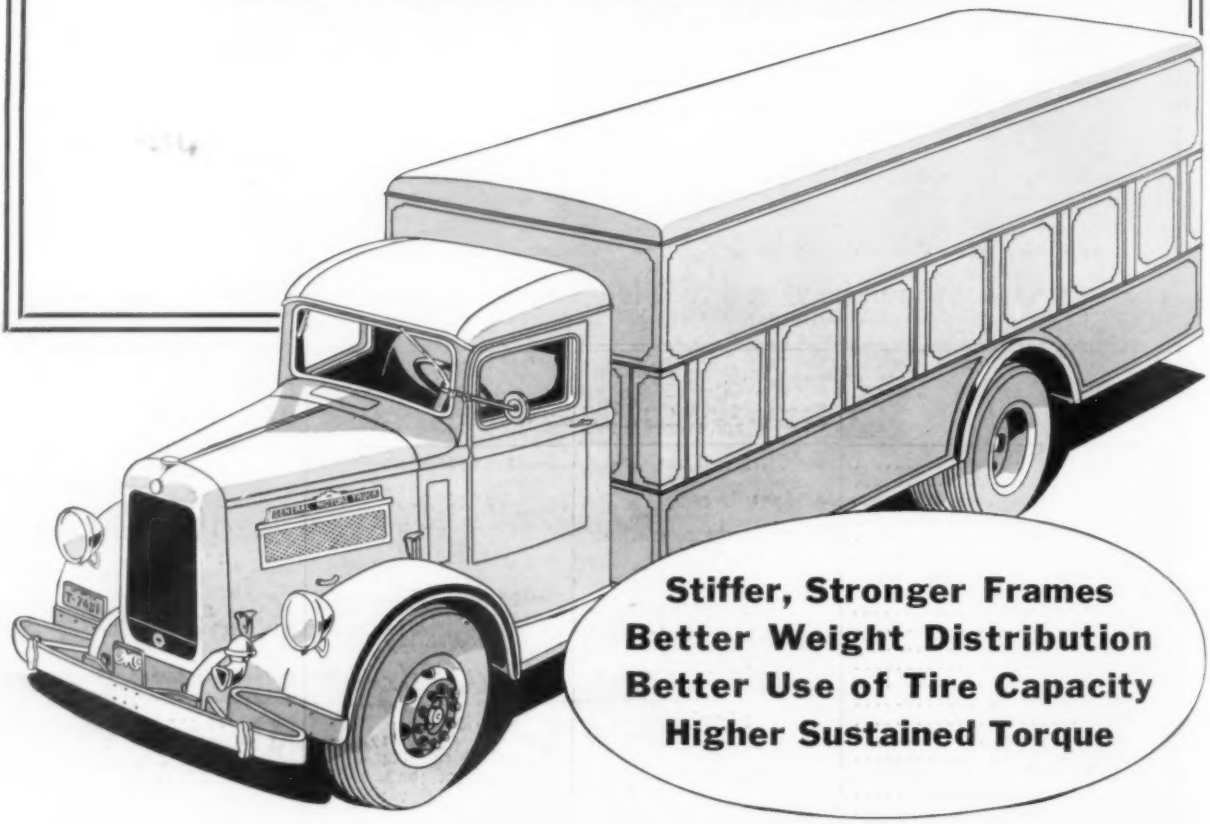

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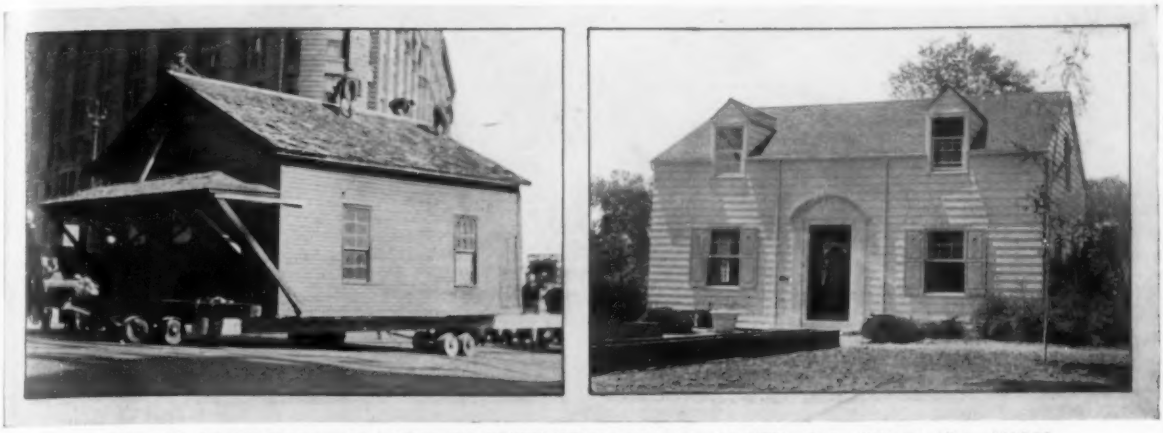

THE OLD SHACK THAT WAS MOVED TO COURT HOUSE SQUARE, DENVER, HAS BECOME THE "MODEL HOUSE" SHOWN IN THE RIGHT-HAND VIEW

Colorado's 43 Home Modernization Campaigns

By **RICHARD L. DAVIES**
State Director, Colorado Clean-up, Paint-up and Modernize Campaign

COLORADO'S novel and ambitious attempt to extricate itself from the depression by encouraging modernization of private homes with private money is showing remarkable results.

Beginning with a free home modernization service for the purpose of providing incentive to individual home owners throughout the state to renovize their homes as models for their neighbors, the campaign has in the last five months developed into a sweeping, vital movement throughout Colorado. Forty-three local community campaigns have sprung up, aided only by suggestions and a little advertising assistance from the State Headquarters in Denver.

Because of this fact, the individual campaigns differ in detail. They all, however, have three major purposes: to beautify and improve the private property of the state in order to attract and please visitors and tourists; to speed the wheels of the building industry in the state; to put our citizens to work. In most of the community campaigns the brunt of the work is being borne by Chambers of Commerce and the Junior Chamber of Commerce. In addition, the public schools, Federation of Women's Clubs, Federation of Labor, various service clubs and architectural groups are without exception supporting the local drives.

Most of the community campaigns are carrying on the free home modernization service initiated at the State Headquarters in Denver. It has been found that there are literally thousands of home owners in the state who are anxious to improve their properties, but who find themselves at loss to crystallize vague desires into actual building activity. With the intensive publicity being given to the various free architectural and landscaping services offered in the various communities, these property owners have been rapidly turning thoughts into results, to the great benefit of the building industry.

Obviously the principal bulwark of sales resistance encountered is the shortage of available funds for remodeling. Each community has its separate scheme for making funds available to the reputable home owner who wishes to modernize. These systems all follow comparatively closely the example given below.

Mr. John Brown feels it would be to his advantage to improve his home. He goes to the free modernization bureau in his community for advice. There an architect outlines to him a sensible and delightful beautification program. But John Brown has been having salary cuts, and he is without the $300 necessary to carry out the architect's design. John Brown also has a first mortgage on his home, and is unable to find any institution willing to loan him more money at a reasonable rate of interest. He is referred by the campaign office to one of the larger banks in the community. This bank issues him $300 in cash, which he pays immediately to contractors, building material dealers, and labor for the improvement. In order to make this possible, he gives the bank his personal note for $300, bearing 6 to 8 per cent interest, and payable in weekly or monthly installments over the course of one year. As additional security to the bank, an organization of building material manufacturers in the community underwrites the note. Naturally, they do not do so until they have found Mr. Brown's credit to be satisfactory.

It has been found that this system takes care of most of the cases where home modernization is needed, and is timely and proper. There seems to be a growing sentiment in Colorado, after experience with the entire program, that whatever loans can conscientiously be made by governmental agencies, can also be soundly made by private agencies in ways such as this.

The whole direction of the project has been from a situation of vague need to a field of decisive action, not on the part of the government, but on the part of the community and the individual. Very symbolically, an old dilapidated shack, condemned by the city, has been moved to the County Court House Square, in the center of Denver. It is being completely rebuilt, step by step, to focus the blurred wish for better homes into the clear-cut picture of building materials being delivered, and of skilled workmen using their saws, mallets, and paint brushes to turn these materials into more HOME.

All lumber for this work on the Denver Court House Square is being furnished by the Retail Lumber Dealers Association of the city. Similarly, the other building material associations furnish *all* materials needed, from plumbing to rosebushes. The planning and supervision is being furnished by the American Institute of Architects, and the various contractors' associations. Union labor is being freely donated for the demonstration house by the various local unions and their members. All of the groups of the community are cooperating fully in this enterprise, and the interest is being shown is indicated by the fact that, at present writing, some 3,000 people per day are inspecting the "Model House" as it nears completion. About the middle of June, the completely rebuilt home will be moved to two lots in the suburbs, donated by the Real Estate Exchange.

Reports of building material dealers indicate that, by that time, approximately $250,000 will have been spent for home modernization alone in this city of less than 300,000 population. Already a shortage of good, union building trades workers is being felt in Denver, and the tourists streaming into the Colorado mountains are finding freshened, beautified communities and highways, as a challenge of the great, sunshiny Centennial State to the entire nation.

ABOVE

At 11,500 feet altitude, a "Caterpillar" Diesel Fifty Tractor hauls supplies for a Colorado water diversion tunnel job, clearing its own way through snow. Fuel cost is only $1.80 per 8-hour shift.

LEFT

Night and day, this "Caterpillar" Diesel Seventy-Five Tractor hauls 40-ton loads of rock and gravel—low cost material transportation for the construction of the San Francisco-Oakland Bridge.

BELOW

Fuel costs for road work in Upsher County, Texas, were cut from $3.50 to 40 cents per day when this "Caterpillar" Diesel Thirty-Five Tractor went to work.

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• • • says a Nebraska contractor who is doing $16.66 more work per day at $7.20 less fuel cost than with his former gasoline tractor.

Fuel economy is the feature every owner lists first among the "Caterpillar" Diesel's advantages—the economy of lower price fuel plus lower fuel consumption. Many users find, too, that the "Caterpillar" Diesel with its steady, lugging power does more work per day than their former gasoline tractors. And all owners praise this tractor's dependability, easy and sure starting, simple operation and maintenance. Today, there are more than 2500 users of "Caterpillar" Diesels. There are three tractor sizes available, and three sizes of stationary power units. Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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The Proposed "National Housing Act"

As this issue of THE AMERICAN CITY goes to press, the Senate Banking and Currency Committee is holding hearings on a measure bearing the inappropriate title of the National Housing Act, which President Roosevelt sent to Congress with his endorsement on May 14.

Under the terms of the proposed act, a Home Credit Insurance Corporation would be set up, with an authorized capital of $200,000,000, which its proponents hope would stimulate the investment of a billion and a half of private capital in home renovation and the construction of new houses.

The HCIC would be empowered to insure banks and other financial institutions against losses which may result from loans or advances of credit for the purpose of enabling home owners and others to make alterations, repairs and improvements. Such insurance would be so limited that "in no case shall the corporation insure any financial institution against losses amounting to more than 20 per cent of the total amount of loans made by it or credit advanced by it as above provided." It would also be a condition that the insurance would apply only to loans or advances of credit in amounts not exceeding $2,000 each. The HCIC on its part would be authorized to rediscount these insured loans of financial institutions to their full face value.

The proposed act further authorizes the HCIC "to insure amortized mortgages and like liens on owner-occupied homes or low-cost housing projects, when presented by approved financial institutions." Such mortgages, to be insurable, must be for sums not in excess of $20,000, and for not more than 60 per cent of the value of existing homes or 80 per cent of the value of homes constructed in future. The loans, it is expected, will carry not more than 5 per cent interest and will be amortized by periodic payments over twenty years.

Other features of the proposed act provide for the incorporation of mortgage associations to serve regions where interest rates are now unduly high, and for insurance for share and certificate holders in building and loan associations, similar to the insurance which has already been provided for bank depositors.

President Signs Municipal Debt Adjustment Bill

On May 24 President Roosevelt signed the Sumners-Wilcox Municipal Debt Adjustment Bill, thus adding a new chapter to the Federal bankruptcy laws under which debt settlements arrived at between insolvent municipalities and holders of a majority in amount of their debts can be made effective in spite of the refusal of minority creditor groups to cooperate.

This legislation was one of the important subjects discussed by the Municipal Securities Committee of the Investment Bankers Association of America at the spring meeting of that association at White Sulphur Springs, W. Va., on May 22. As outlined in the committee report submitted by E. Fleetwood Dunstan, Chairman, the new law "provides that any city, county, town or other political unit which now or during the next two years finds itself insolvent may file a petition in court, declaring that it is unable to meet its debts as they mature. The petition, however, must be accompanied by a plan of readjustment to which creditors owning not less than 51 per cent in amount of claims affected by the plan have assented in writing. If the Court approves the petition as properly filed in good faith, the municipality is required to give notice to creditors of a hearing to be held within 90 days. Any group holding 5 per cent in amount of the indebtedness may appear and controvert the facts alleged in the petition, which will be dismissed in the event the material allegations thereof are not sustained.

"The plan of readjustment shall not be confirmed until it has been accepted by creditors holding two-thirds in amount of the claims of each class affected and by creditors holding 75 per cent in amount of the claims of all classes affected by the plan. Furthermore, any creditor shall be heard on the question of the proposed confirmation of the plan. After hearing such objections as may be made, the judge then shall confirm the plan if satisfied that it is fair, equitable, for the best interests of the creditors and does not discriminate unfairly in favor of any class of creditors."

The Bond Buyer of May 26 reports that the bill as finally amended permits "special districts" to petition the Federal Court with only 30 per cent of creditors assenting, and gives the Court power to confirm a debt settlement after holders of two-thirds of the obligation had assented.

The Bond Buyer also quotes Mr. Dunstan as calling the attention of municipalities to the fact that they "cannot use the new law to avoid or postpone payment of just debts. A few small and scattered solvent communities," he said, "had given evidence of a desire to take advantage of the measure, but the cities could not make an adjustment alone. Even to get into court under the Sumners bill, a city will have to get 51 per cent of its creditors to agree to a definite plan of debt readjustment."

Local Tax Payments Facilitated by HOLC

MORE than $44,000,000 has been turned over to state, county, city and village governments by the Home Owners' Loan Corporation, in payment of back taxes on homes which the Corporation has refinanced, it was shown in a report issued on May 21 by the Washington headquarters of the Federal Home Loan Bank Board.

It was also disclosed that approximately $9,000,000 has been advanced by the Corporation to pay for repairs and maintenance on homes on which it has made loans. About $12,000,000 has been paid for fire insurance on the properties and for such incidental expenses as legal and appraisal fees, costs of title policies, escrow service and recording.

The figures were based on a study of 35,000 closed loans which gave averages that are applied to the entire 231,968 loans, amounting to $681,052,741, closed by the Corporation up to May 11.

"It will be appreciated that the clearing away of all old liens is necessary to give the Corporation the protection of a first mortgage on the home which is security for its loan," John H. Fahey, Chairman of the Federal Home Loan Bank Board, said. "Therefore, the Corporation is advancing cash to pay un all delinquent taxes and assessments when the home owner cannot meet these charges and incorporating these sums in the amounts of the loans. About 6½ cents out of every dollar loaned to date has been used for this purpose. This money has gone into local treasuries in every section of every state in the country, increasing the amounts available to pay school teachers, policemen, firemen and other municipal employees, to retire community obligations and to make local improvements.

"Receipt of these substantial sums has been a heartening factor in many localities which have been gravely handicapped by tax delinquencies.

"The Home Owners' Loan Corporation must be assured that homes which are to be refinanced are in good condition and not subject to undue depreciation. Money is advanced for repairs and painting if necessary. Funds disbursed for this item stimulate local payrolls in the construction and building materials industries. Some small towns report that the entire aspect of the community has been changed by fresh paint on many houses. Of course, the recent amendment permitting modernization will greatly increase the amount expended for desirable repairs and rehabilitation on each home where the condition of the borrower makes it possible.

"It is required that the government be protected by fire insurance on every loan. The total of approximately $12,000,000 represents the costs of the insurance, plus all other costs of the loan that are added to the obligation of the borrower. This computation does not include cases where the home owner himself pays for repairs and insurance, where the taxes had been paid by the mortgagee, and where the existing insurance policy has not expired.

"All of these sums, in addition to the 575 to 600 millions of dollars in bonds which have already gone to the original mortgagees, have been distributed widely in every state in the country."

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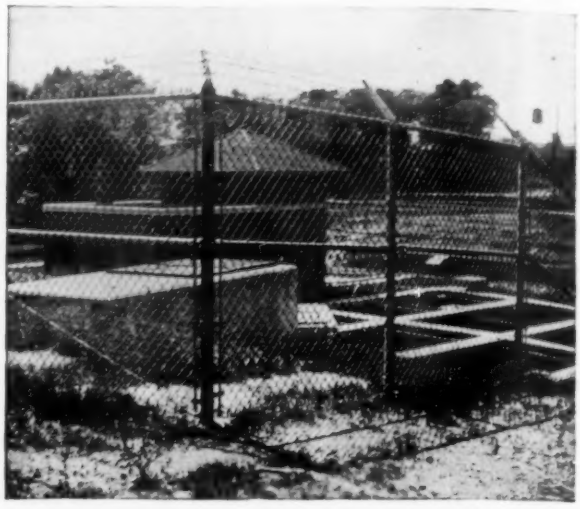

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Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

ZONING and PLANNING NOTES

From Data collected by the Zoning Committee of New York (233 Broadway)

Streets

ALABAMA.— *McIntosh v. Moody*, 153 So. 182 (Supreme Court, March 1, 1934). —The construction and maintenance of a building in a street constitutes a public nuisance subject to be abated in a proper proceeding. Property owners who suffer damage from such a nuisance, peculiar to them and not suffered in common by the general public, may maintain suit in their own names to abate the nuisance.

Parks

CALIFORNIA.—*Spinks v. City of Los Angeles*, 31 Pac. 2d, 193 (Supreme Court, March 26, 1934.)—The city of Los Angeles is the absolute owner, in fee, of a tract of land which it holds as successor of the Mexican pueblo of the same name. For many years the city has set this land aside and used it as a park, known as West Lake Park. The charter of the city provides that all lands "set apart or dedicated for the use of the public as a public park shall forever remain to the use of the public inviolate; provided, however, that the Board of Park Commissioners may, with the approval of the Council, given by ordinance . . . . authorize the opening, establishment and maintenance of streets or other public ways in or through such parks."

Proceedings were initiated by the City Council and the Board of Park Commissioners for the extension of Wilshire Boulevard through West Lake Park. Abutting property owners sought to enjoin the city from using any part of the park for this purpose. The Court refused to grant the injunction, and thus authorizes the taking of a part of the park for street purposes as proposed by the city.

Where a tract of land is donated to a city with a restriction upon it, as, for instance, that it shall be used solely as a park, the city cannot legally divert such property to purposes inconsistent with the terms of the grant. The present case is not one of this sort; here the city is only devoting its own property to a different public use than that to which it has been heretofore subjected.

The right of a municipality to meet changing conditions in its development cannot be denied, even though in so doing it imposes burdensome restrictions upon private property. An abutting owner, as such, has no special right or interest which entitles him to insist upon the continued use of the public property for the purpose to which it has been dedicated. Thus, where the city owns park land absolutely, in fee, the owner of abutting land cannot prevent the erection of a publicly owned structure on a part of the park, although that structure may not be built for a park use.

EDITOR'S NOTE.—The right of the city to divert park land to other uses, and the limitations of that right, are discussed in the Michigan case of *Briggs v. City of Grand Rapids*, and the Editor's Note on that case, to be found in our issue of March, 1933.

Airports

GEORGIA.—*Thrasher v. City of Atlanta*, 173 S. E. 817 (Supreme Court, February 20, 1934).—The plaintiff owns and occupies a residence in the vicinity of Candler Field, an airport established and controlled by the city of Atlanta, and used by aviation companies. He brings this suit against the city and these companies, claiming damages for nuisance. The acts upon which he makes this claim are flights over his property at an altitude less than 500 feet, and dust and noise occasioned in the conduct of the port.

The airport was established by virtue of the Act of August 23, 1927, of the General Assembly of the state. That Act expressly empowered the city of Atlanta to establish and operate an airport. By this franchise aviation in Georgia was recognized as a lawful business, and also as an enterprise affected by a public interest. Upon the establishment of any such airport by the municipality, all persons using it in the manner contemplated by law are within the protection and immunity of the franchise granted to the municipality. An airport is not a nuisance *per se*, although it may become such from the manner of its construction or operation.

Mere apprehension of injury from the falling of planes is not sufficient to authorize an injunction against aerial navigation over the property of the plaintiff. The unnecessary and improper creation and spreading of dust may constitute a nuisance affording ground for the recovery of damages and the granting of an injunction.

Aerial navigation over the land of another cannot be said to be a trespass without taking into consideration the question of altitude. It may or may not be a trespass according to all the circumstances, including altitude; and even when the act does not constitute a trespass, it may amount to a nuisance, as where it occasions hurt, inconvenience or damage to the occupant below. In the present case the facts alleged by the plaintiff, of flights at a lower height than 500 feet, among others, were insufficient to show that the flying of aircraft through the space above this land constituted either a trespass or a nuisance.

EDITOR'S NOTE.—Involved in this case are the rights of the landowner in the air space above his land, and the right of the pilot to traverse this space in his plane. These questions were discussed at length in the Ohio case of *Swetland v. Curtiss Airports Corporation* in the United States District Court, given in our Notes for August and October, 1930. That case held that the landowner did not have title to the air space above him, but only to so much of it as he could occupy; and that the aviator had the right to traverse this space not so occupied, but was liable to the landowner for any actual injury done. The rights in this air space may be adjusted as to landowner and aviator by the police power and proper statutes under it.

The reader should note that such a statute was passed by the Ohio Legislature in 1933, but, as this case was begun before that statute was passed, it does not affect this case. Apparently, however, the decision would have been the same if the statute had been applicable.

Garage—Non-Conforming Use

NEW YORK.—*People ex rel. Arseekay Syndicate, Inc., v. Connell*, 270 N. Y. S. 232 (Supreme Court, Appellate Division, March 16, 1934).—The use of the property in this case for a gasoline station, a non-conforming use, should be temporary, and the order should provide that when circumstances so change, by development of the neighborhood, that the property is reasonably susceptible of being applied to a conforming use, then, upon the application of the authorities or any one interested, the gasoline station must be removed.

EDITOR'S NOTE.—This use is in accord with the New York case of *People ex rel. St. Albans-Springfield Corporation v. Connell*, reported in our September, 1931, Notes.

Zoning Ordinance—Garage—Nuisance

PENNSYLVANIA.—*Walker v. Delaware County Trust Co.*, 171 Atl. 458 (Supreme Court, March 19,1934).—This is an action for an injunction to prevent the Delaware company from erecting a filling station in a residential neighborhood. The Court below granted the injunction; and this Court on appeal reversed that Court, refused the injunction, and allowed the filling station to be erected. The Court below granted the injunction because the land was in a residential neighborhood. This Court reverses them because of commercial developments in the vicinity, and because of the fact that the zoning ordinance of the city had placed the land in question in a commercial district, in which filling stations are permitted. This fact would not deter equity from enjoining the erection of a filling station. Acts of municipal officers under zoning legislation permitting the use of property for what is or may be a nuisance do not oust the jurisdiction of equity to determine whether a nuisance in fact exists and should be restricted; but the ordinance is in the nature of a fact found or an expression of municipal thought and opinion. Such ordinances may thus aid courts in determining the question involved, but are not conclusive, and in the opinion of this Court the Court below did not give due weight to the existence of the zoning ordinance here.

EDITOR'S NOTE.—With regard to the effect of a zoning ordinance in actions such as these, see the Massachusetts case of *Tortorella v. H. Traiser & Co.*, and note, in the March, 1934, issue of Zoning and Planning Notes.

"REVOLUTIONARY!" "OUTSTANDING!" "ECONOMICAL!" "APPROVED!" • are the verdicts on soil-stabilized roads

● **HIGH construction costs are no longer an unassailable excuse for withholding the much-needed improvement of thousands of miles of secondary highways used by a very large percentage of the citizens of every state. "Soil stabilization" has been definitely proved a highly successful — and amazingly economical — method for producing a hard, all-weather type of road surface. Here are a few of the many statements on record showing that most any county or community *can* afford "soil-stabilized" roads:**

"It will revolutionize secondary road building"

"We think so much of this new type of road that personally I am convinced it will revolutionize secondary road building in this country. The principles involved in its construction are so simple that it is a marvel they haven't been adopted widely before this. Of course, new applications of Calcium Chloride must be made at intervals, but the maintenance cost of the new road will compare favorably with other surfacing requiring an initial construction investment three times as great. All in all, such are the advantages to be gained from this type of road that we are questioning, not its expediency, but whether we can afford *not* to build it."—*C. W. McClain, Chief Engineer of Highway Maintenance for Indiana.*

"Land-owners approve Calcium Chloride roads"

"In 1932 we constructed fifty miles of stabilized gravel roads. This construction was so satisfactory that the 1933 program was confined wholly to this type of road. By the end of 1933 a total of 335 miles had been completed, furnishing employment for as many as 6000 workers. The complimentary attitude of the public is gratifying. We have many letters from land-owners along these roads, emphasizing their approval of them and requesting that we do not change this type in the future. We are more than satisfied with our results, for we feel that we have furnished the taxpayers with well-drained, properly aligned, usable roads which can be developed into high-type roads at relatively low cost when conditions warrant."—*R. B. Traver, County Engineer, Onondaga County, N. Y.*

"The most outstanding development in highway engineering"

"Undoubtedly the most outstanding development in highway engineering in the past year was the development of soil stabilization practice, whereby, through the combination of soils having varying characteristics, a firm and stable road surface is obtained. In this method clay is incorporated in existing sand or gravel by scarifying, pulverizing and mixing; and after shaping and dampening, a relatively small amount of Calcium Chloride is added. For a road in Michigan the total cost of such work amounted to 3.6c per square yard, or $381 per mile, including rental for the equipment used. . . . Not only do such types provide a satisfactory road surface for present use, but as traffic increases, surface treatments, or mixed-in-place, retread, concrete or other pavements can be placed on them at a relatively small expenditure."—*From discussion on "Low-cost Road Construction" in March, 1934, issue of "Public Works."*

"An economical investment"

"This type of low-cost gravel street is an investment that amply fulfills the need of residence districts having moderate traffic. It can be easily maintained in a smooth condition at a low expense. Retention of Calcium Chloride is more satisfactory in this type of surface than when ordinary unbound gravel is used. Thus a continuously dustless surface is provided at low cost."—*Karl B. Robertson and D. N. Smith, City Engineer and Construction Engineer respectively, Midland, Mich., in "American City Magazine," May,* 1933.

"A good road summer and winter"

"The surface remained in good condition through the summer and required no patching except in a few places along the stabilized material. There was no deterioration or slipperiness through a very wet fall, and this uniformly good condition extended into the winter."—*L. L. Bateman, County Engineer, Huron County, Mich., in "Better Roads," May,* 1933.

● **Add to such emphatic approval from reliable sources the fact that "soil-stabilization" has had the benefit of wide research by the U. S. Bureau of Public Roads, and of thorough trial in hundreds of instances, and little doubt remains that this is *the* type of low-cost road for the future as well as for the immediate stretching of curtailed highway budgets. Every county engineer and other highway official should become fully acquainted with this modern development. Write for free literature. Address any of these members of the CALCIUM CHLORIDE ASSOCIATION:**

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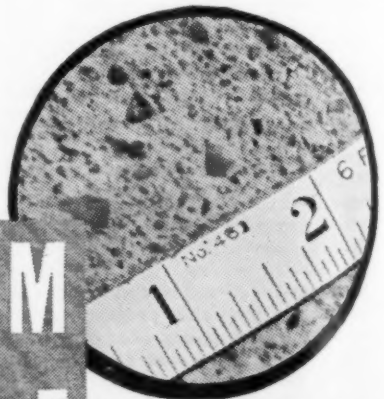

for stabilizing road surfaces

THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, Attorney at Law

Accidents

Town held not liable for defective condition of traffic light unauthorizedly installed by it at intersection of state and county roads (New York Supreme Court, Appellate Division: *Cleveland v. Town of Lancaster*, 267 N. Y. Supp. 673).

Small plank placed across street held insufficient warning to travelers against excavation extending across street (Mississippi Supreme Court: *Thomas v. City of Lexington*, 150 So. 816).

City held liable for fatal injury to pedestrian who slipped on a sloping sidewalk where a driveway crossed (Pennsylvania Supreme Court: *Williams v. Kozlowski*, 169 Atl. 148).

City could regulate operation by concessionaire of boats on lake used for both recreational and water-supply purposes (Oklahoma Supreme Court: *Lakeview, Inc., v. Davidson*, 26 Pac. 2d, 760).

Minor child could recover damages from city for injury on defective sidewalk, even though city could hold father liable for reimbursement because of his control over sidewalk; abutting property owner may be compelled to indemnify city for accident due to defect of which he had notice and reasonable time to repair, although owner had leased property to third party (Pennsylvan.. Superior Court: *Briggs v. City of Philadelphia*, 170 Atl. 871).

City held entitled to reimbursement against abutter for damages recovered by pedestrian injured through defective condition of sidewalk known to abutter (Pennsylvania Superior Court: *Fisher v. City of Philadelphia*, 170 Atl. 875).

Notice of damage claim for accident stated as occurring at or near "*738* Washington Street" held insufficient to support suit for accident occurring at or near *1738* Washington Street (Iowa Supreme Court: *Tredwell v. City of Waterloo*, 251 N. W. 37).

Business Regulations

Ordinance requiring that pasteurized milk sold in city be pasteurized within city limits held void as being unreasonable (Minnesota Supreme Court: *State v. City of Minneapolis*, 251 N. W. 121).

Civil Service

Appointing officer, not civil service commission, held vested with discretion to determine fitness of applicant for position; refusal to appoint applicant who had been previously dismissed for presenting improper expense account upheld, despite his certification by the commission (New Jersey Supreme Court: *Santangelo v. Civil Service Commission*, 170 Atl. 861).

Policeman held automatically removed by conviction of murder (Tennessee Supreme Court: *State v. City of Knoxville*, 64 S. W. 2d, 7).

Civil service employee may lose right to salary and reinstatement after wrongful dismissal by delaying steps to recover position (Ohio Court of Appeals, Cuyahoga County: *State v. Kalina*, 187 N. E. 645).

Contracts

Paving contract held invalid where let after more than half of the work had been done (Tennessee Supreme Court: *Johnson City v. Carnegie Realty Co.*, 64 S. W. 2d, 507).

Statute requiring advertisement for bids for "two consecutive weeks" held substantially observed where street improvement bids were received after 13 days' advertising but contract was not let until two days later (Kentucky Court of Appeals: *Jenkins v. City of Bowling Green*, 64 S. W. 2d, 457).

Drains

Engineer held qualified to testify as expert witness whether flooding of land was caused by clogging of culvert (Pennsylvania Supreme Court: *Page v. City of Pittsburgh*, 169 Atl. 104).

Elections

Submission of charter amendment in connection with general election held "special election." Blank ballots cast held properly excluded in computing total number of votes (Minnesota Supreme Court: *Godward v. City of Minneapolis*, 250 N. W. 719).

Finances

Taxpayers held entitled to enjoin use of city's general funds to discharge subway obligations (New York Supreme Court, Appellate Division: *Osborn v. O'Brien*, 267 N. Y. Supp. 689).

Garbage Disposal

City of New York given time to install incinerators before discontinuing ocean dumping, subject to liability to New Jersey municipalities for polluting waters (United States Supreme Court: *State of New Jersey v. City of New York*, 54 Sup. Ct. 136).

City held liable for impairing enjoyment of nearby property through offensive odors, etc., emitted by garbage disposal plant, regardless of negligence (Texas Court of Civil Appeals, *City of Tyler v. House*, 64 S. W. 2d, 1007).

Home Rule Charters

Home rule charter held abolishable under iniative and referendum provisions (Ohio Supreme Court: *City of Youngstown v. Craver*, 187 N. E. 715).

Improvement Assessments

Lands held by railroad for future use held assessable for local improvements, but not lands presently used for railway purposes (Alabama Supreme Court: *City of Birmingham v. Seaboard Airline Railway Co.*, 148 So. 425).

A school district is not subject to personal judgment for unpaid special assessment against its property (Oklahoma Supreme Court: *Independent School District No. 39 v. Exchange National Bank*, 23 Pac. 2d, 210). Nor is a city so subject (Oklahoma Supreme Court: *City of Drumright v. Exchange National Bank*, 23 Pac. 2d, 213).

License Taxes

Payment of state and municipal license tax for business of retailing motor fuels and lubricants held not to preclude additional municipal tax for maintaining tanks on public sidewalks (North Carolina Supreme Court: *State v. Evans*, 171 S. E. 640).

Municipal Expenditures

City held liable for hire of automobiles by Mayor's committee for reception of distinguished guests, especially since similar claims previously had been allowed (New York Supreme Court: *Club Auto Renting Service v. City of New York*, 267 N. Y. Supp. 122).

Municipal Utilities

City operating electric plant could not make property owner personally liable for current furnished to tenant, under statute authorizing assessment against property for current supplied to it (Iowa Supreme Court: *City of Onawa v. Mona Motor Oil Co.*, 252 N. W. 544).

Statutes held to authorize city to establish system to distribute electric current to be supplied from contractor's generating plant (Missouri Supreme Court: *Palmer v. City of Liberal*, 64 S. W. 2d, 265).

Ordinances

One convicted of violating ordinance held not entitled to question its constitutionality for the first time on appeal (Louisiana Supreme Court: *City of New Orleans v. Dunlap*, 150 So. 847).

Police Bonds

Chief of Police and his surety held liable for detaining motorists on charge of driving without authorized license plates, without affording reasonable opportunity to furnish bond for appearance (United States Circuit Court of Appeals, Fourth Circuit: *Moran v. City of Beckley*, 67 Fed. 2d, 161).

Public Utilities

Gross receipts tax imposed on gas company under municipal franchise, for use of streets, held subject to judicial review as to reasonableness (Washington Supreme Court, *City of Spokane v. Spokane Gas & Fuel Co.*, 26 Pac. 2d, 1034).

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The rugged frame, heavy-duty clutch, trouble-free 4-speed transmission and special V-8 engine are real truck units, built for hard service. The V-8 engine, which develops over 80 horsepower, uses no more fuel than a "four" . . . simply divides the same amount of gasoline into eight parts. See this New Ford V-8 Truck at your nearest dealer's.

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SPECIAL V-8 TRUCK ENGINE. 80 horsepower. New dual carburetor, new truck-type cylinder heads, new heavy-duty copper-lead connecting-rod bearings.

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MUNICIPAL AND CIVIC PUBLICATIONS

Prices quoted do not include postage, unless so stated

Local Government

Municipal Government in the United States.—By Thomas Harrison Reed, Professor of Political Science and Director of the Bureau of Government, University of Michigan. Revised edition, 1934. D. Appleton—Century Company, New York. 406 *pp.* $3.50 *from* THE AMERICAN CITY.

The many and rapid developments that have affected municipal government in the eight years since the first edition of this valuable book was published have called for its revision and enlargement. The same vigorous and lucid exposition of what the author's wide study and experience have yielded deals with the later growth of city functions and problems. A new chapter, "What Constitutes Good City Government," shows how the quality of municipal service may be tested by its relation to cost and public satisfaction. It is emphasized that great care must be exercised in coming to the conclusion that the cost of government is too high. "Cities do not exist to make money or to save money but to spend it wisely in the public interest. Even in times of economic stress the problem of economy in municipal expenditure is to be approached with circumspection. Short cuts to economy by slashing tax rates without careful predetermination of where economies are to be made may well be productive of more harm than good. . . . Retrenchment should never be sought in such a way as to destroy the whole fabric or any of its essential parts." The principles and procedure of municipal finance are thoroughly discussed in a separate chapter. Among the most interesting reviews of conditions is "Municipal Politics and Politicians of Today," which ends: "There is not a city in the land today which rests contentedly under a dishonest government." The problem of metropolitan areas and its attempted solutions receive extended treatment.

Water Supply

Water Supply Organization in the Chicago Region.—By Max R. White. The University of Chicago Press Chicago, Ill. 1934. 170 *pp.* $2.00.

There are 96 metropolitan districts in the United States, each with a minimum population of 100,000 and with a total population of 54,743,645. These include many governments, comprising a central city and many suburbs and satellites. The problem of relationship of such a group of entities is complex. This book offers a study of the method of furnishing water to one of the greatest metropolitan areas in this country, and in so doing sheds some light on the larger problems of governmental organizations in metropolitan areas. It concretely treats the Chicago region and its varied water systems, their quality, operation, personnel and finances, and other metropolitan systems, and gives conclusions and some alternatives for reorganization.

Finance

Taxes and Tax Trends.—By Katherine A. Frederic. The National League of Women Voters, Washington, D. C. 144 *pp.* 50c.

This carefully prepared handbook of public finance should prove exceedingly useful as a reference book for elementary courses in taxation. It is a clear, concise presentation of the subject. Tax terms are carefully defined and a well-selected bibliography is appended. One could wish that the author had been somewhat more outspoken in the discussion of certain controversial taxes, such as income and sales and real estate taxes, but for the purpose for which the study was no doubt intended, as a basis and starting point for discussion, it is admirably adapted.

Salaries

The April, 1934, *Bulletin* of the American Library Association is the Salaries Number. Following an introductory article on "Surveys and Salaries," by John Boynton Kaiser, Chairman of the A. L. A. Committee on Salaries and Employment, there is much tabular material on salaries in school, college, university, and public libraries. 48 pp. (Apply to the Association, 520 N. Michigan Ave., Chicago, Ill.)

Municipal Government and Administration

The Municipal Year Book, 1934.—*Edited by Clarence E. Ridley and Orin F. Nolting. Published by the International City Managers' Association, Chicago, Ill.* 1934. *VIII* + 256 *pp.* $4.00.

A comprehensive view of the governmental forms and administrative activities of American cities of over 30,000 population is given in this new year book, which has extended the field of the well-known City Manager Yearbook. A group of six general articles by authorities in municipal government and administration looks out over the perplexing conditions and situations in city finance caused by the growth in the size of cities and the increase in city functions, and surveys the manner and the results of quickened citizen participation in government and the expanding Federal participation in municipal affairs. Emphasis is placed upon the need of intelligent advice and suggestions from leagues of municipalities and professional organizations of public officials in the working-out of Federal policies concerning municipal problems. Recent changes in the structure of local government are outlined, indicating progress in achieving reform.

Twenty articles by other authorities deal specifically with the various divisions of municipal administration in 1933: financial planning, budgeting, taxes and assessments, accounting, and purchasing; civil service; the powers of cities, and legal decisions on administrative matters; city and regional planning, recreation, housing and public welfare; schools; health, police, fire administration, public works, utilities; county management, and council-manager government.

Part Two gives tabular information on cities over, and under, 30,000—forms of government, boards and commissions, salary data, directories of city officials, including city managers, and financial statistics of cities for 1933. Part III is devoted to selected bibliographies.

State Government

American State Government and Administration.—By Austin F. Macdonald, Ph.D., Professor of Political Science, University of California. (A volume in Crowell's Social Science Series, edited by Seba Eldridge, University of Kansas.) Thomas Y. Crowell Co., New York. XIII + 839 *pp.* $3.75.

This textbook not only equips the student for thorough work, but makes illuminating reading for those to whom the relation between the states and the Federal Government, and between the states and their counties and municipalities, is misty. It takes into account the rapid changes taking place, while not overestimating their likelihood of permanence. The structure of the states, the mechanism by which they exist, and function, their authority over the powers of counties, townships and municipalities, with full discussion of the principle of home rule; the various forms of American city government; the "headless and formless" structure of county government; and chapter-by-chapter explanation of the administrative activities of the states—law enforcement, the courts, correction, charity, education, health, highways, natural resources; the states' relations to business and to labor; all these, with a wealth of supporting references and analytical comment, are presented in a way to stimulate intelligent comprehension.

Local Government

On May 1, 1934, the Bureau of Statistics, Department of Municipal Affairs, Quebec, Canada, issued a 95-page pamphlet containing the following alphabetical lists: the county municipalities in the province of Quebec, with the county town and the name and address of the secretary-treasurer and warden respectively; the cities, towns, villages, parishes and townships, with the name of the municipal county, the name and address of the secretary-treasurer, and the name of the mayor. This covers 1934-35. (Apply to G. E. Marquis, Head of the Bureau, Quebec, Que.)

A Glossary of Planning

*International Glossary of Technical Terms Used in Housing and Town Planning.—International Federation for Housing and Town Planning, 25 Bedford Row, London, W.C.*1. 80 pp. *Price* 5/-, (*to members of affiliated societies* 2/6*d*).

This glossary is the work of a subcommittee of the Federation, the members of which are Prof. A. Bruggeman, G. L. Pepler, Dr. R. Schmidt and Dr. Virgilio Testa, with H. Chapman, who has edited the work. It is not intended to be a dictionary, nor to include all the terms used in housing and town planning, for the equivalents of many of these can be found quite clearly stated in an ordinary bilingual dictionary. It is a handy reference work in four languages (English, French, German and Italian) to enable one to find quickly equivalents or definitions of housing and town planning terms not usually included in non-technical bi-lingual dictionaries. Reference to the work is quite a simple matter, as all the terms are in a single list in alphabetical order and therefore an index is unnecessary. A reader or writer requiring to find an equivalent for a particular term has only to refer to this term in its alphabetical order, where he will find all the equivalents in the three other languages and, if necessary, a definition also.

Housing

"Toward Fuller Living through Public Housing and Leisure Time Activities" has been prepared by Abraham Goldfeld, Executive Director of the Fred L. Lavanburg Foundation and supervisor of the Lavanburg Homes, a low-cost housing project on the Lower East Side. It is published by the National Public Housing Conference, 112 E. 19th St., New York, with the purpose of showing that housing should include provisions for social, recreational and educational activities, and that people take advantage of such opportunities when offered. European housing projects with social activities are presented as influencing our ideas of this movement. The five American projects studied in respect to their leisure time activities are Sunnyside, Amalgamated Houses, Lavanburg Homes, Dunbar Apartments, and Radburn. 56 pp. Illustrated. (Apply to the Conference.)

The National Association of Housing Officials (850 E. 58th St., Chicago, Ill.) has published a manual entitled "Demolition of Unsafe and Insanitary Housing: An Outline of Procedure for a Comprehensive Program." Every step of the procedure, and the various conditions that exist or arise in connection with the legal and industrial handling of such undertakings, are considered, and the forms and methods that have proved effective in certain cities are presented. The Association will send experienced and qualified consultants (without charge) to local communities to assist in planning a demolition program. At the present time a number of factors make it easier to secure the consent of owners to the demolition of their obsolescent and inadequate property. 36 photo offset reproduction pp. Illustrated. Free to public officials; 25c to others. (Apply to the Association.)

A recent bulletin issued by the Boston Housing Association states the objectives, methods and procedures of a housing program for Boston, and answers some essential questions on housing and slum reconstruction, making it clear that Boston can effectively take part in this wide movement for economic and social betterment. 8 pp. (Apply to the Association, 41 Mount Vernon St., Boston, Mass.)

Municipal Finance

"The Financing of City and Village Government in Wisconsin" is a mimeographed report (22 pp.) of a survey made by the League of Wisconsin Municipalities, with recommendations presented to the Wisconsin Legislative Interim Committee on Taxation Problems. April 11, 1934. 25c. (Apply to the League, 114 N. Carroll St., Madison, Wis.)

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Health

Survey of Public Health Nursing—Administration and Practice.—By the National Organization for Public Health Nursing; Katharine Tucker, General Director, Hortense Hilbert, Assistant Director for the Survey. Published by The Commonwealth Fund, 41 E. 57th St., New York. 1934. XV + 262 pp. Many tables. $2.00.

It has long been recognized that an authoritative evaluation of the methods and procedure of public health nursing as an essential part of the public health movement was needed to increase its effectiveness. The data for this survey were obtained from November, 1931, to June, 1932, and the work was national in scope, covering 28 communities in different parts of the country, with 68 official and non-official public health nursing agencies. The findings, and the conclusions and recommendations, are fully set forth under the following divisions of the field: organization; personnel; provisions for the education of nursing personnel; working conditions; student affiliation; financing the service; community relationships; the nursing program; performance. It is a frank report of a candid and thorough study.

Health Commissioner John L. Rice of New York City recommends in his news release of May 20, 1934, that those who are planning for their annual summer vacations make provisions for "a round trip ticket for their health." He maintains that it is possible to get reliable information about the health conditions of any prospective vacation place, and he enlarges in an authoritative and interesting way upon the procedure which wise vacationists will adopt. (Apply to the Health Commissioner, 139 Centre St., New York.)

Housing and Taxation

"The Relation of Housing to Taxation" is a paper by Harold S. Buttenheim, Editor of THE AMERICAN CITY, reprinted from the symposium on "Low-Cost Housing and Slum Clearance," published in *Law and Contemporary Problems*, the quarterly journal issued by Duke University, Durham, N. C. It shows that a system of scientific taxation will make land cheaper and houses cheaper to build and maintain, and will help to banish low wages, which combat decent housing. 9 pp. 10c. (Apply to THE AMERICAN CITY.)

"An Analysis of a Slum Area in Cleveland" has been prepared for the Cleveland Metropolitan Housing Authority by Rev. R. B. Navin, Wm. D. Peattie, F. R. Stewart and staff, with the counsel of Howard Whipple Green, consultant, Division of Housing, Federal Emergency Administration of Public Works. "The purpose of this study is to determine whether or not the assumption is correct that the real estate tax income fails to meet the costs of operation of a slum area." 30 mimeographed pp.; folding map. (Apply to the Cleveland Metropolitan Housing Authority, Cleveland, Ohio.)

Police Radio

Information on more than 70 municipal systems of police radio—from New York City to Las Vegas—is contained in a mimeographed report of 53 pp. entitled "Municipal Police Radio Systems." It has been prepared by Paul V. Betters, Executive Director, American Municipal Association, as Report No. 89. April, 1934. General engineering data are given in the first chapter and other information about the radio equipment of municipal police departments and maintenance and operation costs. Specific phases of radio-communication systems are treated in other chapters. $1.00. (Apply to the Association, Drexel Ave. and 58th St., Chicago, Ill.)

Civic-Commercial Activities

The Vermont State Chamber of Commerce has summarized its program of making the people understand and share government, in a little 4-page folder, "4 Insurance Policies for Town-Meeting Democracy in Vermont." The four policies are: Regional Meetings of Citizens and Officials (October-December); Budget Committees of Citizens and Officials (January); Illuminating Town Reports (February); "Get-Together" Conference Hearings to Discuss the Budget (late February—early March). "An attempt to state the case in dramatic and persuasive fashion." (Apply to James P. Taylor, Sec. of the Chamber, Burlington, Vt.)

Hospitals

The Hospital: Manual of Operation.—By Warren P. Morrill, Ph.B., M.D., formerly Superintendent, Sydenham Hospital, Baltimore; General Hospital, Winnipeg; University Hospital, Augusta, Ga.; Shreveport Charity Hospital, Shreveport, La.; Columbia Hospital for Women, Washington, D. C.; Maine General Hospital, Portland. Lakeside Publishing Co., New York. 1934. *XI + 315 pp. Illustrated.* $3.00.

The practical, everyday problems of hospital operation are dealt with in this volume, presenting, from a background of wide knowledge and experience and with a fine spirit of public service, the details of method and procedures which hospital executives and their staffs must handle. The various chapters deal with: Organization; Staff Organization; Planning and Construction; Admission and Discharge Procedures; Purchase and Issuance; Nursing Department; Dietary Department; Housekeeping; Mechanical Department; Special Equipment; Clinical Records; Fire Protection; Accounting; Public Relations.

The "Report from the Special Committee Appointed by the Royal Institute of British Architects on the Cost of Hospitals" has recently been published by the Institute. The committee was composed of five architects, each of whom has had wide experience in the design of hospitals, and of one Fellow of the Chartered Surveyors' Institution. The Report is concerned primarily with non-teaching general hospitals, but makes many incidental recommendations which apply equally well to other hospitals. After discussing standardization in hospital design, it formulates a basis on which a true comparison of costs can be made, and then deals briefly with special forms of construction. An important part of the Report considers the most economical disposition of buildings on a site and of departments within a building scheme. It is of value to building promoters, governing bodies, architects and surveyors. 31 pp. 1s. 6d., post free. (Apply to the Royal Institute of British Architects, 9, Conduit St., London, W.1, England.)

Taxation

The General Welfare Tax League has recently issued a number of timely publications on current tax questions. February *Taxbits* contains papers delivered at the annual meeting of the League, by Roy G. Blakey, Ralph E. Flanders, Mark Graves, Robert Murray Haig, James W. Martin, Mabel Newcomer and Carl Shoup. 31 mimeographed pp., with supplement. 35c.

The March *Taxbits* analyzes the situation with respect to constitutional uniformity clauses and their effect upon tax developments. 12 pp. mim. 25c. April *Taxbits* contains tables showing the extent to which states are sharing income, inheritance, gasoline, motor vehicle, general sales and liquor taxes with the local governments. 9 pp. mim. 25c.

A pamphlet, "Where the Sales Tax Falls," takes up the very vital consideration of the varying weight of this tax upon different income groups and shows graphically how it penalizes the poverty-stricken. 12 pp. 25c. (Apply to the League, 309 E. 34th St., New York.)

Recreation

The Year Book Number of *Recreation*, published by the National Recreation Association, appeared as the May, 1934, issue. It is a valuable summary of the many phases of the work of the Association in 1933, and of the progress of the national recreation movement. Its most notable section is the "Tables of Playground and Community Recreation Statistics for 1933," giving information as to management, financial support, and indoor and outdoor facilities. (32 pp.) 72 pp. in the issue. 50c. (Apply to the Association, 315 Fourth Ave., New York.)

Zoning

The Supplement to the May, 1934, issue of *The Municipality*, published by the League of Wisconsin Municipalities, has been reprinted. It contains "A Zoning Manual for Wisconsin Cities and Villages, Including a Skeleton Zoning Ordinance," prepared by A. J. Rabuck, field representative of the League, assisted by criticisms and suggestions from others. 16 quarto pp. 50c. (Apply to the League, 114 N. Carroll St., Madison, Wis.)

Bridges

The 1934 "Proceedings" of the American Toll Bridge Association has recently been published. It contains a number of articles on different phases of toll bridge operation and matters relative thereto, and also a list of all toll bridges in the United States. $1.00. (Apply to P. K. Schuyler, Secretary of the Association, 1024 Vermont Ave., Washington, D. C.)

Municipal Ownership

"Results of Municipal Lighting Plants: The Answer to the City's Financial Problems" is a record of 365 cities under municipal ownership, with rates in effect 1933. It has been prepared by C. F. Lambert and is published by the Burns & McDonnell Engineering Co., consulting engineers, Kansas City, Mo. Third edition. The number of plants listed in this presentation of comparable data is over three times the number listed in the original book. 160 pp. Graphs, charts, tables. $1.00. (Apply to the publishers, 107 W. Linwood Blvd., Kansas City, Mo.)

Government and Administration

The United States Municipal News is a biweekly bulletin (photo offset reproduction) published jointly by the American Municipal Association and the United States Conference of Mayors (Drexel Ave. and 58th St., Chicago, Ill.) The editor is Paul V. Betters, Executive Director of the Conference. It gives a record of municipal progress, in pithy comment and fact analysis, with occasional reproductions of newspaper items. (Annual subscription, $6.00; single copies, 50c. Each issue is punched for binding; binder, $1.00.)

Municipal Scrip

The American Municipal Association and the Municipal Finance Officers' Association have prepared and issued jointly "Municipal Scrip—A Report of Experience," analyzing various sample situations and stating observations and conclusions. It is Report No. 90 of the American Municipal Association, and Report No. 66 of the United States Conference of Mayors. May, 1934. 17 pp. in photo offset reproduction. 25c. See also page 93 in this issue. (Apply to the American Municipal Association, 850 E. 58th St., Chicago, Ill.)

Other Reports Received

AMSTERDAM, HOLLAND.—Nederlandsch Institut voor Volkhuisvesting en Stedebouw, 1933. 19 mimeographed pp.

ATLANTA, GA.—Annual Report, City Comptroller, 1933. 91 pp.

CHICAGO, ILL.—Annual Appropriation Bill of the City for 1934.—150 pp. (Send 10c in stamps to Municipal Reference Library.)

CHICAGO, ILL.—Annual Report, Board of Supervising Engineers, Chicago Traction, year ended January 31, 1934. 126 pp.

CHICAGO, ILL.—Cook County Appropriation Bill, 1934. 119 pp. (Send 3c in stamps to Municipal Reference Library.)

CONNECTICUT.—Annual Report, State Department of Motor Vehicles, 1933. 32 pp.

DES MOINES, IOWA.—Annual Report, City Plan and Zoning Commission, year ending March 31, 1934. 22 mimeographed pp.

EAST CLEVELAND, OHIO.—Annual Report, City Commission, 1933. 4 pp.

ERIE, PA.—Annual Report, Director, Department of Accounts and Finance, January 1, 1934. 71 pp.

FLINT, MICH.—Annual Report, Sewage Treatment Plant, 1933. 30 mimeographed pp., besides folding tables.

GRAND RAPIDS, MICH.—Annual Report, Treatment Works Division, Department of Public Service, 1933-1934.—71 hektographed and photo offset pp.

HENNEPIN COUNTY, MINN.—Financial Statement, 1933. 57 pp.

HUNTINGTON, IND.—Annual Report, City Clerk, 1933. 44 pp.

MULTNOMAH COUNTY (PORTLAND), ORE.—1933 Annual Report, Tax Supervising and Conservation Commission: "Budget Facts and Financial Statistics." 110 pp.

NEW YORK CITY.—Annual Report, Museum of the City of New York, 1933. 76 pp.

WESTFIELD, MASS.—Annual Reports, 1933. 128 pp.

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CONVENTIONS—WHEN AND WHERE

(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)

JUNE 1-8.—NEW YORK. (1,200)
American Water Works Association. Annual convention. (Hotel Commodore.) Secretary, Beekman C. Little, 29 West 39th Street, New York.

JUNE 5-7.—WASHINGTON, D. C.
Conference of State and Provincial Health Authorities of North America. Secretary, Dr. A. J. Chesley, State Board of Health, St. Paul, Minn. *Conference of State and Territorial Health Officers with the U. S. Public Health Service.* Address: Surgeon General, U. S. Public Health Service, Treasury Department, Washington, D. C. *Annual conferences.*

JUNE 6-8.—ROCHESTER, MINN. (325)
League of Minnesota Municipalities. Annual convention. Executive Secretary, Morris B. Lambie, University of Minnesota, Minneapolis, Minn.

JUNE 7.—NEW YORK. (75)
National Automobile Chamber of Commerce. Annual meeting. General Manager, Alfred Reeves, 366 Madison Avenue, New York.

JUNE 7-9.—PINEVILLE, KY. (200)
National Conference on State Parks. Annual meeting. Executive Secretary, Herbert Evison, 905 Union Trust Building, Washington, D. C.

JUNE 9-10.—GREENWICH, CONN.
New England Association of Commercial Executives. Annual meeting. Secretary, Lewis W. Neweld, Salem, Mass.

JUNE 11, WEEK OF.—CAMBRIDGE, MASS.
New England Water Works Association. Water Works School. Secretary, Frank J. Gifford, 714 Tremont Temple, Boston, Mass.

JUNE 11-12.—NEW CASTLE, PA. (50)
Pennsylvania Association of Planning Commissioners. Annual convention. Secretary-Treasurer, Arthur Cassell, Allentown, Pa.

JUNE 12-14.—JAMESTOWN, N. Y.
Conference of Mayors and Other Municipal Officials of the State of New York. Annual conference. Secretary, William P. Capes, City Hall, Albany, N. Y.

JUNE 13-14.—WAUKEGAN, ILL. (100)
Illinois Association of Sanitary Districts. Annual meeting. Secretary-Treasurer, G. H. Radebaugh, Urbana & Champaign Sanitary District, Urbana, Ill.

JUNE 14-15.—GREEN BAY, WIS.
League of Wisconsin Municipalities. Annual convention. Secretary, Frederick MacMillin, 114 North Carroll Street, Madison, Wis.

JUNE 15-16.—JAMESTOWN, N. Y. (100)
New York State Sewage Works Association. Spring meeting. Secretary, A. S. Bedell, State Department of Health, Albany, N. Y.

JUNE 18-19.—HAMPTON BEACH, N. H.
American Shore and Beach Preservation Association. Annual meeting. Secretary-Treasurer, Victor Gelineau, 1 Exchange Place, Jersey City, N. J.

JUNE 18-21.—CLEVELAND, OHIO. (900)
National Association of Purchasing Agents. Annual convention and Informashow. Secretary-Treasurer, G. A. Renard, 11 Park Place, New York.

JUNE 19-21.—STROUDSBURG, PA.
Pennsylvania State Association of Boroughs. Annual convention. Secretary, J. Herman Knisely, Bureau of Municipalities, Harrisburg, Pa.

JUNE 19-22.—BUFFALO, N. Y.
Smoke Prevention Association. Annual convention. Secretary, Frank A. Chambers, 1411 City Hall Square Building, Chicago, Ill.

JUNE 24-30.—MINNEAPOLIS, MINN. (1,000)
National Association of Real Estate Boards. Annual convention. Executive Secretary, Herbert U. Nelson, 59 East Van Buren Street, Chicago, Ill.

JUNE 25.—WASHINGTON, D. C.
American Automobile Association. Annual meeting. Executive Vice-President, Ernest N. Smith, Pennsylvania Avenue at 17th Street, Washington, D. C.

JUNE 25-29.—HOT SPRINGS, VA.
American Institute of Electrical Engineers. Annual summer convention. Assistant National Secretary, H. H. Henline, 33 West 39th Street, New York.

JUNE 25.—SALT LAKE CITY, UTAH.
American Legislators' Association. Western Bus and Truck Conference. Executive Director, Henry W. Toll, Drexel Avenue and 58th Street, Chicago, Ill.

JUNE 25-28.—DENVER, COLO. (1,500)
American Society of Mechanical Engineers. Semi-annual meeting. Secretary, C. W. Rice, 29 West 39th Street, New York.

JUNE 25-27.—STATE COLLEGE, PA.
Pennsylvania Water Works Operators' Association. Annual convention. Secretary-Treasurer, I. M. Glace, 506 South Office Building, State Capitol, Harrisburg, Pa.

JUNE 26-28.—BURLINGTON, VT. (200)
New England Association of Fire Chiefs. Annual convention. Secretary-Treasurer, John W. O'Hearn, 99 Main Street, Watertown, Mass.

JUNE 27-29.—STATE COLLEGE, PA. (130)
Pennsylvania Sewage Works Association. Annual meeting. Secretary, L. D. Matter, Kirby Health Center, Wilkes-Barre, Pa.

JUNE 30—JULY 6.—WASHINGTON, D. C. (10,000)
National Education Association of the United States. Annual meeting. Secretary, J. W. Crabtree, 1201 16th Street, N. W., Washington, D. C.

JULY 11-14.—VANCOUVER, B. C.
American Society of Civil Engineers. Annual convention. Secretary, George T. Seabury, 33 West 39th Street, New York.

JULY 12-14.—MARTINSVILLE, VA.
American Water Works Association—Virginia Section. Secretary, H. W. Snidow, 601 State Office Building, Richmond, Va.

JULY 19-22.—LYON, FRANCE.
International Union of Local Authorities. Sixth congress. General Secretary, 3 bis, Rue de la Régence, Brussels, Belgium.

JULY 20.—NEW YORK.
Conference on the Educational Plant and the City Plan. Chairman, Dr. N. L. Engelhardt, Teachers College, Columbia University, N. Y.

JULY 20-22.—QUEBEC, QUE. (100)
Union of Canadian Municipalities. Annual convention. Secretary, Samuel Baker, City Clerk, London, Ont.

JULY 29—AUGUST 3.—STANFORD UNIVERSITY, CALIF.
Western School for Commercial Secretaries. Manager, Leonard E. Read, 304 Merchants Exchange Building, San Francisco, Calif.

AUGUST 6, WEEK OF.—CHICAGO, ILL.
National Institute for Commercial and Trade Organization Executives. Annual session. Secretary, John N. Van der Vries, 607 First National Bank Building, Chicago, Ill.

AUGUST, SECOND WEEK OF.—RICHFIELD, UTAH. (300)
Utah State Municipal League. Annual convention. Secretary-Treasurer, P. K. Nielsen, Price, Utah.

AUGUST 16-17.—HARRISBURG, PA.
League of Cities of the Third Class in Pennsylvania. Annual convention. Secretary, Herman A Early, City Hall, Harrisburg, Pa.

AUGUST 20-24.—NEW YORK.
National Association of Public School Business Officials. Annual meeting. Secretary, John S. Mount, State Department of Public Instruction, Trenton, N. J.

AUGUST 21-24.—MILWAUKEE, WIS.
International Association of Fire Chiefs. Annual convention. Secretary, James J. Mulcahey, Yonkers, N. Y.

AUGUST 21-23.—WATERLOO, IOWA. (400)
League of Iowa Municipalities. Annual meeting. Secretary-Treasurer, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 23-24.—WHEELING, W. VA.
American Water Works Association—Central States Section. Annual convention. Secretary, H L. Nelson, 2435 Koppers Building, Pittsburgh, Pa.

AUGUST 25-27.—WILLIAMSPORT, PA. (300)
Pennsylvania Chiefs of Police Association. Annual convention. Secretary, F. B. Titus, Chief of Police, Lansdowne, Pa.

AUGUST 28-30.—TORONTO, ONT.
Ontario Municipal Association. Annual meeting. Secretary-Treasurer, H. L. Brittain, 137 Wellington Street W., Toronto, Ont.

AUGUST 29—SEPTEMBER 1.—WASHINGTON, D. C.
International Association of Municipal Electricians. Annual convention. (Wardman Park Hotel.) Secretary, W. H. Harth, Columbia, S. C.

AUGUST 30-31.—PITTSBURGH, PA. (200)
National Shade Tree Conference. Annual convention. Secretary-Treasurer, Dr. R. P. White, New Jersey Agricultural Experiment Station, New Brunswick, N. J.

SEPTEMBER 3-6.—PASADENA, CALIF.
American Public Health Association. Annual meeting. Acting Executive Secretary, Dr. Kendall Emerson, 450 Seventh Avenue, New York.

SEPTEMBER 3-8.—MUNICH, GERMANY.
Permanent International Association of Road Congresses. Seventh International Road Congress. Thomas H. MacDonald, Secretary General, American Organizing Committee, 1723 N Street N. W., Washington, D. C.

SEPTEMBER 11-13.—MURRAY BAY, QUE.
Canadian Good Roads Association. Annual convention. Secretary-Treasurer, George A. McNamee, New Birks Building, Montreal, Que.

SEPTEMBER 12-14.—FORT WAYNE, IND. (500)
Municipal League of Indiana. Annual convention. Executive Secretary, S. E. Spurgeon, Municipal League Review, Kokomo, Ind.

SEPTEMBER 16-21.—LOUISVILLE, KY. (300)
American Institute of Park Executives and the American Park Society. Annual convention. Executive Secretary, William H. Walker, 2234 Inglewood Place, South Bend, Ind.

SEPTEMBER 17-19.—SANTE FE, N. MEX.
American Water Works Association—Rocky Mountain Section. Annual meeting. Secretary-Treasurer, B. V. Howe, 437 State Office Building, Denver, Colo.

SEPTEMBER 17-19.—PHILADELPHIA, PA.
Municipal Finance Officers' Association of the United States and Canada. Annual convention. Executive Director, Carl H. Chatters, 850 East 58th Street, Chicago, Ill.

SEPTEMBER 24-27.—ROCHESTER, N. Y.
American Society of Municipal Engineers. Annual convention. Secretary, C. W. S. Sammelman, 4359 Lindell Boulevard, St. Louis, Mo.

SEPTEMBER 24-27.—PASADENA, CALIF. (2,000)
League of California Municipalities. Annual convention. Executive Secretary, J. W. Charleville, 681 Market Street, San Francisco, Calif.

SEPTEMBER 24-27.—WASHINGTON, D. C.
International Association of Chiefs of Police. Annual convention. Secretary, George Black, Chief of Police, Wilmington, Del.

SEPTEMBER 24-27.—NEW YORK.
National Association of Commercial Organization Secretaries. Annual convention. Secretary-Treasurer, Glen B. Eastburn, Chamber of Commerce, Omaha, Nebr.

SEPTEMBER 26-28.—ROCHESTER, N. Y.
International Association of Public Works Officials. Annual convention. (Sagamore Hotel.) Secretary, A. M. Anderson, 100 North LaSalle Street, Chicago, Ill.

OCTOBER 1-4.—BALTIMORE, MD. (450)
Illuminating Engineering Society. Annual convention. General Secretary, D. W. Atwater, 29 West 39th Street, New York.

OCTOBER 1-5.—CLEVELAND, OHIO.
National Safety Council. Annual congress. Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

OCTOBER 15-17.—ST. LOUIS, MO. (300)
International City Managers' Association. Annual convention. Executive Director, Clarence E. Ridley, 850 East 58th Street, Chicago, Ill.

OCTOBER 15-18.—WACO, TEXAS. (350)
Southwest Water Works Association. Annual convention. (Hotel Hilton.) Secretary-Treasurer, Lewis A. Quigley, Fort Worth, Texas.

YOURS FOR THE ASKING . . . .

A New Catalog Featuring Road Maintenance and Construction Equipment

The Littleford Model C Pressure Distributor, made in capacities from 500 to 1500 gallons—one of the many pieces of road equipment shown in the new Littleford Catalog.

An invaluable guide for city, county and state highway officials and paving contractors. . . . More than fifty different outfits for the handling of bituminous materials. . . . Equipment for both maintenance and construction operations. . . . Properly classified and indexed for ready reference. . . . With many new additions to the Littleford Line of Equipment. . . . Write for this catalog, now. . . . It is yours for the asking.

LITTLEFORD

Road Maintenance Equipment

SINCE 1900

LITTLEFORD BROS. 500 **E. PEARL ST. CINCINNATI, O.**

Section of Pennsylvania Railroad Tunnel Underneath the East River, New York, waterproofed with

Sika

WATERPROOFS UNCONDITIONALLY

SIKA mixed with portland cement will stop from the inside against pressure any structurally sound subgrade masonry. SIKA is also an excellent material for the repointing of dams, spillways, etc.

Used on many world famous structures for over twenty years.

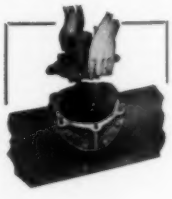
Write us about your problem.

SIKA Inc., 1943C Grand Central Terminal, N. Y. City

NOW IS THE TIME!

With city officials demanding greater efficiency in water works management, there never was a time more opportune for the installation of Main-Line Metering, Indicating and Recording equipment. With such equipment you KNOW not GUESS. And you have concise, permanent records for reference always.

HERE IS THE WAY!



Sparling Main-Line Meters, used by a thousand cities from Maine to California and by hundreds of large industrial plants, can be installed in your system very quickly and with no shut-downs or loss of time.

The cost is low. The accuracy is constant over wide ranges of flow and periods of time. And Sparlings are not affected by freezing, vibration or sediment in suspension.

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NEWS AND ILLUSTRATIONS

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

ENJOYING THE NEWEST BRADLEY STREET SHOWERS

New and Improved Models of Street Showers

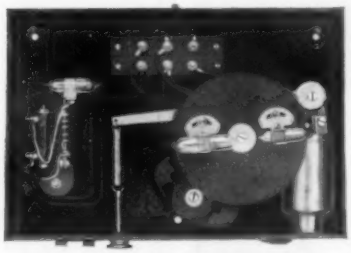
Bradley street showers, made by Bradley Washfountain Co., 2203 West Michigan Street, Milwaukee, Wis., provide happy, healthful recreation for city children at any hydrant or other water outlet. They supply a gentle shower of cool, clear water over a semi-circular area 50 to 60 feet in diameter, the spray being so well diffused that cold water is tempered by warm air before striking the bathers. Because of their finely diffused spray these street showers are extremely economical in the use of water. Also, since the volume of the shower can be regulated while the hydrant is wide open, waste of water through the hydrant leak port is prevented.

These street showers are made in two models, Type C and Type S. The Type C showers have straight tailpieces and are designed for hydrants having outlets at right angles to the curb, and Type S showers have swivel connections and can be used at any angle. Other new features are full-range volume control from 0 to 125 gallons per minute, and tailpiece connections of seamless drawn brass tubing, permitting lighter weight fixtures and greatly increased capacity.

A Water-Level Control for Elevated Tanks

The Type A Roto-Trol was designed particularly for the automatic control of water levels in elevated tanks, and it can be readily adjusted on the job to meet a wide variety of operating conditions. It has an electric surge-snubbing device which locks the starter in both the start and stop positions, and prevents the pump from cutting in and out in rapid succession owing to starting and stopping surges. This electric snubber eliminates the necessity for surge tanks and other auxiliary devices.

This instrument, made by the Water Level Controls Co., 763 Hampden Avenue, St. Paul, Minn., can be readily set for practically any desired water-level differentials, for the high-level setting and the low-level setting are controlled by separate mercury switches on the Roto-Trol disc. Either the high- or the low-level setting can be raised or lowered by adjusting the proper mercury switch on the control disc, and the adjustment of one level setting does not change the adjustment of the other. There is also a thumb-screw adjustment for raising or lowering the water-level differential in the tank without changing the differential itself. The control disc has a capacity of several mercury switches, and it can be readily utilized to operate a second or third pump or high- and low-water alarms or signals.



A WATER-LEVEL CONTROL FOR ELEVATED TANKS

Manufacturers of Road Equipment Consolidate

The Western Wheeled Scraper Co., of Aurora, Ill., and the Austin Manufacturing Co., Chicago and Harvey, Ill., have announced a consolidation, the new company to be known as the Western-Austin Manufacturing Co. The Western Wheeled Scraper Co. originated the wheeled scraper more than fifty years ago. Later, closely allied interests acquired the Austin Manufacturing Co., established about the same time to manufacture a similar line of road-building equipment, and in order to market the road machinery products of the two companies the Austin-Western Road Machinery Co. was formed. The Western Wheeled Scraper Co. also maintained its own sales organization, which eventually resulted in a duplication of service, making consolidation desirable. It is planned that the consolidation shall become effective by July 1, 1934, and that the general office of the new corporation will be at Aurora. The Austin-Western Road Machinery Co. will continue to handle the sales of the manufacturing company.

Crane Company Increases Advertising

As evidence of their belief that business is definitely on the upturn, the Crane Co., 836 South Michigan Avenue, Chicago, Ill., has extended its national trade paper advertising for the rest of the year to cover practically all industries. This company, with factories in Chicago, Bridgeport, Birmingham, Chattanooga, Trenton, and North Tonawanda, N. Y., and branches in 160 cities, is the largest manufacturer of valves and fittings in the world. The increased advertising schedule will include THE AMERICAN CITY in the water-works field as well as publications in the plumbing, heating, medical, educational, power, foods, shipbuilding, oil, gas, textile, laundry, cleaner and dyer, chemical, iron, steel, paper, mining and railway fields.

Spargo Joins Pittsburgh Equitable Sales Staff

The Pittsburgh Equitable Meter Co., Pittsburgh, Pa., has announced that E. E. Spargo has joined its sales force, specializing in liquid meter sales. After two years with the Fry Equipment Corporation, he joined the Wayne Pump Co. in 1928. Three years later he transferred to the Pennsylvania Pump Co., where he was successively Sales Manager of the Philadelphia and the Pittsburgh office. He was serving in the latter position when he joined the sales force of the Pittsburgh Equitable Meter Co. Mr. Spargo will be located at the New York office.

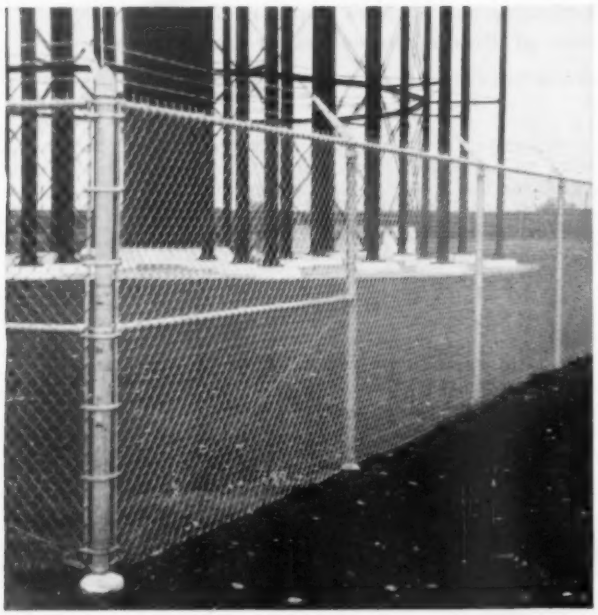
Improved Economy Burner

Better appearance and strong construction have been incorporated in the new patented Economy burner announced by The Toledo Pressed Steel Co., Toledo, Ohio. In place of a machined screw collar fastened onto the top of the torch shell, the new construction provides a heavier drawn collar, which is imbedded in the torch body over a wider area. The new collar conforms with the general lines of the torch body and produces a more compact unit. The lower portion of the hood in relation to the body of the torch results in an improvement in performance, as well as facilitating the installation of the hood after filling.

Another improvement is the one-piece wick-holder. This has certain features which eliminate the bleeding of oil at all times whether the torch is burning or not. Bleeding and seepage of oil caused by the continual vibration of constant driving conditions are overcome by this improvement, which eliminates a familiar nuisance and conserves the fuel supply.

ONE-PIECE WICK-HOLDER

LOWER FENCE COST



GET THESE 5 NEW FEATURES

● The way to get lower fence cost is to buy a **better** fence. Continental does make a better fence—and you can actually prove it on the basis of visible value. Among the new features that add extra years of fence life are these: Heavier and stronger H-section line posts; wire of higher tensile strength—85,000 lbs. per square inch; new exclusive top rail coupling 7" long—fits inside as well as outside; new tension locking pin that eliminates all bolts and nuts; improved pivot type hinges that insure perfect gate operation without any maintenance.

Write for new catalog showing wide variety of styles and detail facts to guide you in selecting the fence that offers **lower cost per year of service.**

CONTINENTAL STEEL CORPORATION

Dept. C, Kokomo, Indiana

Manufacturers of Billets, Rods, Wire, Barbed Wire, Nails; Chain-Link, Lawn, Farm and Poultry Fence and Gates: Black, Galvanized, Galvannealed and Special Coated Sheets; Galvanized Roofing; (also "Seal of Quality" Roofing) and Kindred Products.

CONTINENTAL

TRADE MARK REG U.S PAT. OFF

Chain Link **FENCE**

OFFERS LOWER COST PER YEAR OF SERVICE

WEEDS

Dolge Super-Strength Weed Killer destroys weeds without laborious scraping or hoeing. Dilute the concentrate with water—Sprinkle on the infested areas. It penetrates into the roots and your weed problem is solved for the season.

STONO Cleans all types of granite—no streaking.

NOMOLE Scientifically destroys moles and gophers.

Write for your free copy of Ground Maintenance Manual

The C. B. Dolge Company

Westport Connecticut

COLDWELL

Above: Coldwell "L-Twin" motor lawn mower and roller. Mows and rolls simultaneously 4 to 6 acres a day. With gang units attached it cuts a 60-inch swath, ten acres a day.

A WELL-GROOMED LAWN . . .

. . . will be assured if the turf is carefully rolled and mowed with a Coldwell . . .

The Coldwell Power Lawn Mowers and Rollers are turf builders of known and time-honored ability.

In every feature of design and in the materials employed, dependable, economical operation is the watchword.

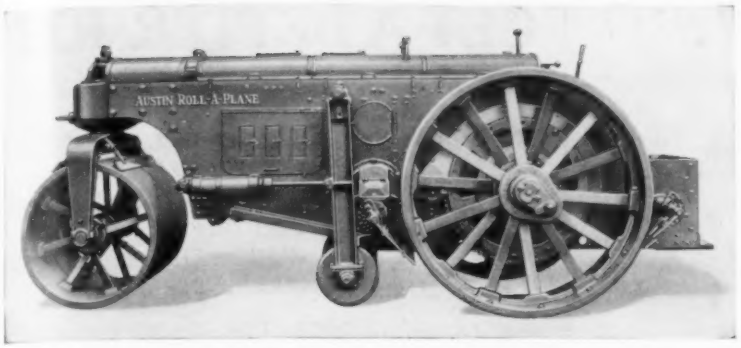
There's a style and size suitable for any lawn.

Full particulars on request

COLDWELL LAWN MOWER CO., NEWBURGH, N. Y., U. S. A.

In Canada—Taylor-Forbes Co., Ltd., Guelph

Manufacturers of ***DEPENDABLE*** *Lawn Mowers*—HAND, HORSE, GASOLINE, ELECTRIC



THE NEW AUSTIN ROLLER WITH THE CENTER-ROLL FEATURE

A Center Roll Feature of New Road Roller

A new three-wheel roller, operating on an entirely new principle for securing levelness and smoothness of bituminous pavement surfaces, has been announced by the Austin-Western Road Machinery Co., 400 North Michigan Avenue, Chicago, Ill. This Roll-A-Plane is claimed to reduce the cost of surface finishing and subgrade preparation and impart a level smoothness to the road.

The feature of the new roller is an additional center roller which is hydraulically operated from the dash and can be raised or lowered to any position or set to form a perfect plane with the front and rear rolls. When large waves or irregularities are encountered, this center roll may be raised slightly to assist in the smoothing-down process, after which the roll is lowered in line with the other rolls to complete the operation.

On asphalt or black top, the center roll is capable of concentrating 85 per cent of the total roller weight on the high spots. This amounts to a maximum pressure of 20,375 pounds, with the 10-ton model, or a lineal-inch compression of 450 pounds and up, depending upon the amount of surface in contact with the center roll.

The Roll-A-Plane automatically indicates high and low area, permitting immediate correction, while the asphalt is still hot. The center roll can be removed whenever it is desired to do so.

A Sludge Disintegrator and Blender

The Royer sludge disintegrator and blender consists of a body cast with a cavity or housing for a motor with extension arms at an angle of 45 degrees for supporting pulley bearings on which a drive and loose pulley are mounted. An endless belt running over the pulleys and studded with steel sprigs, spaced so as to form pockets with the sprigs, travels on a plane of approximately 45 degrees. Suspended above the belt is an open hopper or funnel for guiding sand onto the belt, the upper end being formed by a flexible steel sweep, and the lower by a retaining plate.

Sludge is shoveled or conveyed into the hopper and comes in direct contact with the sprigs on the belt, which travels toward the discharge, combs or rakes the bottom surface of sludge in the hopper into a granular form, the grains gravitating into the pockets formed by the sprigs. The blending of the sludge and other ingredients and separation of the scrap is due to the spacing of the sprigs and the speed at which they travel on a straight plane through the hopper.

As the sprigs enter the hopper they come in contact with and set up a raking action on the sludge, the pieces lodging into the pockets formed by the spacing of the sprigs. Owing, however, to the speed of travel of the sprigs, the pockets are not completely loaded until they have traveled the entire length of the hopper and for this reason have collected portions of various ingredients in the hopper, as they came in contact with them. The pockets are unloaded by centrifugal force as the sprigs emerge from the hopper underneath and pass around the upper pulley. The scrap, nails, pebbles, etc., owing to the speed of travel and the spacing of the sprigs, do not lodge in the pockets but gravitate to the bottom of the hopper, at which end they are discharged, when the belt is running free from sludge.

Thorough mixing and aeration are accomplished by this machine, and a minimum of expense for manual labor and mechanical power for either small or large quantities of sludge processed. The Royer sludge disintegrator and blender is made by the Royer Manufacturing Co., Wilkes-Barre, Pa., and sold by C. G. Wigley, 3108 Atlantic Avenue, Atlantic City, N. J.

Billings Elected Vice-President of Cabot

The directors of Godfrey L. Cabot, Inc., 940 Old South Building, Boston, Mass., manufacturers of carbon black, have elected Edmund Billings a Vice-President of the corporation. Mr. Billings is well known among manufacturers of rubber, paint, and ink products in the United States and abroad, as Sales Manager of the Cabot organization for the past ten years.

Thawing Frozen Hydrants

Last winter plenty of hydrants were frozen in the severe cold waves which swept across the country. Many cities experienced considerable trouble in thawing out these hydrants, on account of lack of proper equipment. The Fire Chief steam generator, made by the American Steel Works, Kansas City, Mo., is a complete unit capable of thawing out frozen fire plugs or frozen pipes. It is also used for cleaning the motor blocks of tractors and trucks, oily fenders, and fire plugs. It is a compact unit mounted on wheels but readily carried in a light utility truck and measures 45 inches long, 18 inches wide and 36 inches high. Its small boiler will generate 75 pounds of steam pressure in 20 to 30 minutes, and it is a continuous operating unit maintaining a pressure of 40 to 50 pounds through a 3/16-inch nozzle, at an operating cost of 3 cents per hour. It is furnished complete as illustrated with 15 feet of $\frac{3}{8}$-inch steam hose and a steaming nozzle.

THE FIRE CHIEF STEAM GENERATOR

Speed Night Repairs

WITH HOMELITE *Portable Floodlighting*

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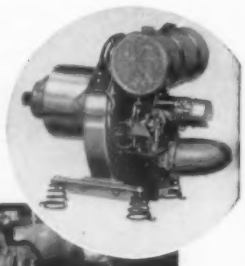

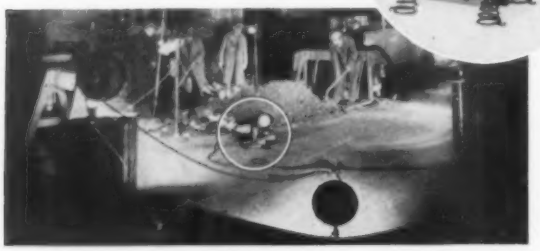

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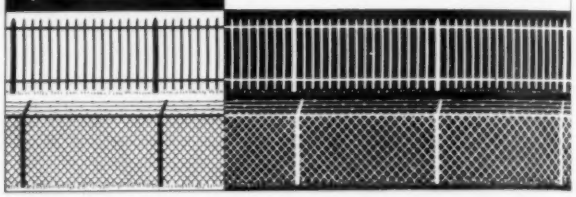

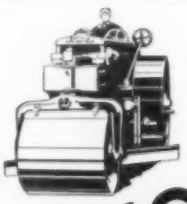

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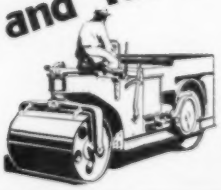

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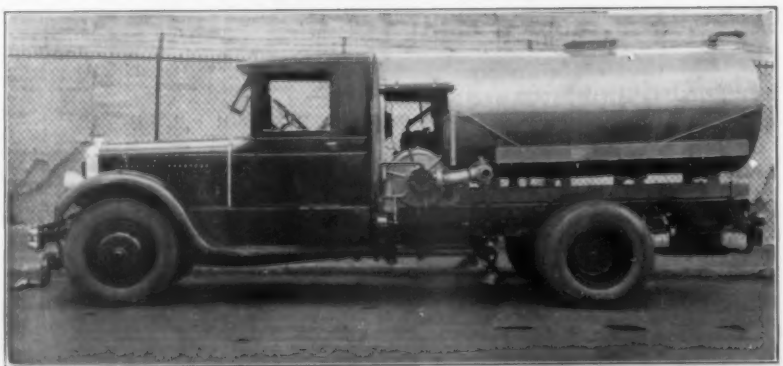

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FORD V-8 HYDRAULIC DUMP-TRUCKS RECEIVING THEIR LOADS OF EARTH EXCAVATION FROM A BUCYRUS-ERIE POWER SHOVEL ON A ROAD-WIDENING PROJECT IN DETROIT

Hydraulic Dump-Trucks Used for Heavy Construction

In the widening of a street in Detroit, Mich., the Michigan State Highway Department used 5-ton dump-trucks for removing excavated earth loaded by steam shovels. In the lull in the operations, two new Ford V-8 hydraulic dump-trucks, made by the Ford Motor Co., Dearborn, Mich., were backed into the excavation. The big shovels lost no time in filling the trucks, and straight out over a soft rough track the Ford V-8's climbed and into the street again. The services of the special crew which had been smoothing the way for the 5-ton trucks were not necessary. The Ford trucks demonstrated that they could pull their way out with heavy loads over bad terrain, owing to the power of the V-8 engines. The Michigan State Highway Department has just taken delivery of thirteen new Ford V-8 hydraulic dump-trucks fitted with Wood-type bodies for service on highway construction and maintenance projects in all sections of the state.

Bowman Elected to Board of Federal

The Federal Motor Truck Co., Detroit, Mich., has elected J. F. Bowman, Vice-President in Charge of Sales, to its Board of Directors. He has been Vice-President in Charge of Sales since January, 1933. Years ago, he served Federal as General Sales Manager, and later became identified with the Garford Motor Truck Co., for five years, then for eight years, before rejoining Federal, he operated as distributor for a well-known line of passenger cars and trucks.

"Saddle Bags" for Handling Sewage Sludge

At sewage treatment plants using sand drying beds, the removal of the dried sludge presents a troublesome and almost continuous problem. Some plants employ trucks which run upon fixed or movable runways, while others use industrial railway equipment. The Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has developed a crawler type tractor upon which side-dump sludge bins are mounted and which has been used effectively at the sewage treatment plant of the Springfield, Ill., Sanitary District.

These bins hold 2¾ cubic yards of sludge equally divided between the two sides, and are provided with dumping levers which can be operated from the driver's seat. The superimposed load, added to that of the tractor, results in a uniform pressure of 10 pounds per square inch under the surface of the crawlers in contact with the sand. The loading edges of the bins are about 3.5 feet above the sand.

It has been noted in Springfield that the crawler caused very little disturbance to or compacting of the sand beds. Owing to the mobility of the tractor it can be placed within easy loading distance, with the result that it is possible to clean the sludge beds in much less time than was formerly required. The bins dump the load freely, and the sludge being dumped forms windrows on either side of the tractor. When the disposal area is filled, the tractor is run on top of the sludge, and windrows are started at a higher level.

AN ALLIS-CHALMERS CRAWLER TRACTOR WITH "SADDLE-BAGS" FOR HANDLING SEWAGE SLUDGE, AT SPRINGFIELD, ILL.

Johns-Manville Establishes New Department

The Johns-Manville Sales Corporation, 22 East 40th Street, New York, has recently established a special department to handle the sale of its Transite pressure pipe to municipalities and privately owned water companies. This new department will be known as the General Transite Pipe Department.

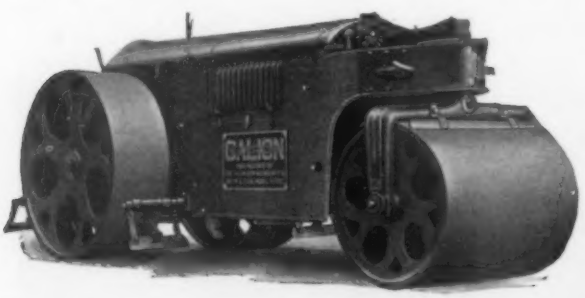
Paul D. Mallay, formerly Chief Engineer of the Transite Pipe Department, has been made General Manager, with headquarters in New York City. Others to be connected with this department include C. A. McGinnis, Sales Manager, with headquarters in New York City; Leonard Saine, Southern Representative, with headquarters in Atlanta, Ga.; Steven B. Avery, Eastern Representative, with headquarters in New York City; and F. B. Holgate, Sales Representative for the New York State region. A. J. Maahs, formerly of the Lock Joint Pipe Co., has been made Chief Engineer.

A New Three-Wheel Motor Roller

The new Galion Warrior, a three-wheel motor roller in 5-, 6,- 7,- and 8-ton sizes has recently been announced by the Galion Iron Works & Mfg. Co., Galion, Ohio. It is modern in design and construction and is powered by a smooth, flexible, 37-hp. 6-cylinder engine. The controls are simple, complete and conveniently arranged, enabling the operator to work without effort and excess fatigue.

The Warrior roller is regularly equipped with worm and sector steering gear but can be furnished with a hydraulic steering device. The engine is equipped with an oil-type air cleaner, a variable speed governor and a gas pump. Electric starter and electric lights can be furnished if desired. The transmission is sturdy, and the oversize gears and shafts are fully enclosed and operate in an oil bath. Anti-friction bearings are used throughout. The axles are oversize and are made of special alloy steel and extra-large, long-wearing, trouble-proof clutches are installed. An efficient hydraulic control scarifier can also be supplied.

A 50-gallon sprinkling tank, located inside the frame and under the cowl cover, may be furnished at extra cost. Extra-large sprinkling tanks up to 250-gallon capacities can be furnished on special order. These extra-large tanks will be mounted outside the frame and directly over the rear rolls.



THE WARRIOR ROAD ROLLER

Newton Made Works Manager of Graver

The Graver Tank & Manufacturing Corporation, East Chicago, Ind., has recently appointed Guy H. Newton as Works Manager. Mr. Newton started in the steel fabricating business with Reeves Brothers in Alliance, Ohio, when he was quite a young man and eventually was elevated to the position of Operating Manager. Later he went to Birmingham, Ala., for the same company and became Vice-President and General Manager of the Birmingham plant. In 1925 the Chicago Bridge & Iron Works bought the Birmingham plant of Reeves Brothers, and Mr. Newton was made Executive Vice-President in charge of operations.

A Liquid for Waterproofing Purposes

Everseal liquid, especially adaptable for waterproofing roofs, has recently been announced by the Everseal Manufacturing Co., Fisk Building, New York. Everseal liquid contains no coal tar or any other ingredient that might be injurious to the surface over which it may be applied. It is made of gilsonite, asphalt, and heavy waterproofing oils, combined with Canadian asbestos, making a roof 100 per cent leak-proof. Everseal liquid will save about 75 per cent of the cost of tearing off an old roof and replacing it with a new one, and the only cost is the first cost. Just one application is necessary and the job is done, and since it comes ready for use, any one can apply it It requires no melting, heating or mixing.

This liquid expands and contracts with any surface that it covers, and therefore it will not crack, bulge, peel or chip off. It forms a perfect bond with the surface upon which it is spread, and it will not run under summer sun nor crack in the freezing winter. The asbestos fiber acts as a binder, holding it in place, and it is impervious to water. Everseal liquid is practically indestructible because it is immune against the destructive elements which cause rust, decay and corrosion.

Everseal liquid was awarded the Gold Medal at the International Exposition at Barcelona, 1929, and the Gold Medal at the Greek Industrial Exposition at Salonica, 1933.

Hooded Cans for Convenient Disposal of Rubbish

Witt hooded cans, made by The Witt Cornice Co., Cincinnati, Ohio, are designed for the convenient disposal of waste paper and rubbish and are found on street corners of a great number of municipalities. They are also used on golf courses, playgrounds, parks and cemeteries.

THE WITT HOODED CAN FOR RUBBISH DISPOSAL

Because of the ease with which rubbish, paper and other accumulations may be disposed of, they invite tidiness. They are easily emptied and replaced for continuous service, and are quickly moved from place to place as desired. These cans have a hood which is securely riveted to the solid beaded steel band and covers more than half the diameter of the can, so that paper and light rubbish will not be blown out. The top is heavily wired to give it strength and rigidity. They regularly carry a galvanized finish but they may be lacquered on special order and appropriately stenciled.

New Bottom-Dump Tractor-Truck

The Euclid Road Machinery Co., Cleveland, Ohio, has recently developed a new tractor known as the Trac-Truk. This new Trac-Truk has a speed comparable to that of motor trucks and has the carrying capacity of crawler tractor wagons. Six yards of pay dirt are carried at speeds ranging to 15 miles an hour, and fully twice the yardage per hour is moved with no greater investment. Operating costs, fuel, grease and oil, as well as maintenance, are reduced to levels heretofore impossible.

A 100 horsepower engine insures ample power to operate under severest conditions of grades or soft ground and is especially designed to meet any demands due to the big reserve of power pulling the load over the humps and through soft spots. An extremely short turning radius, approximately 13 feet, speeds up the trips, saving time at each end of the run.

The big, soft pneumatic tractor tires flatten on the ground, carrying half of the gross load. For extreme conditions of soft or slippery ground, tire tracks are furnished which enable the Trac-Truk to operate satisfactorily. This new tractor is powerful, responsible, maneuverable, effective under all conditions and adaptable for many uses.

Outdoor Lighting

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Safety on the Streets

A Discussion of the Cost and Prevention of Traffic Accidents

EDITORIAL NOTE.—*Among the many serious matters confronting municipal governments today, the reduction of traffic accidents must be regarded as one of the most pressing. The urgency of this "worse than war" problem is apparent, whether one places major emphasis upon the humanitarian or the economic aspect of the rising accident toll. The following discussion, which took place recently between R. E. Simpson and the Hon. F. C. Cain, will be found helpful to municipal officials in formulating a comprehensive traffic safety program and in justifying the expenditures involved.*

R. E. Simpson, formerly with the Travelers Insurance Company and now with the National Bureau of Casualty and Surety Underwriters, is nationally recognized as an authority on the causes and prevention of traffic accidents. The Hon. F. C. Cain is Mayor of Cleveland Heights, Ohio. The traffic accident record of Cleveland Heights has been consistently fine. Its traffic fatality rates per 100,000 *population were* 6.8 *in* 1932 *and* 6.4 *in* 1933, *as compared with the average rates of* 11.2 *in* 1932 *and* 12.2 *in* 1933 *for all the cities in the same population class.*

* * *

MAYOR CAIN: Mr. Simpson, I have gone on record that public safety is the first responsibility of a municipal government. One of the largest items under this heading of public safety is traffic safety, and the good record made by Cleveland Heights is evidence that our efforts to reduce traffic accidents have not been in vain. However, all the measures we take for the protection of our traffic cost money, and I am frequently called upon to justify them on economic grounds. Can you give me any figures to help me?

MR. SIMPSON: Yes, I believe I can. We all recognize that in matters of safety the humanitarian considerations far outweigh the economics, but with the present difficulty in balancing municipal budgets the taxpayers have a right to know which expenditures represent the greatest value to the public.

MAYOR CAIN: Exactly. Now with your permission I will step out of my official capacity and become simply "Mr. Private Citizen," well-meaning and reasonable for the most part, but not very well informed on the ramifications of municipal problems. As "Mr. Citizen" I should like to ask you some of the questions about traffic safety measures which have been asked of me. Is that agreeable?

MR. SIMPSON: Yes, go ahead.

"MR. CITIZEN": Mr. Simpson, our officials in this town are spending a lot of time and effort and money to prevent traffic accidents. Still we have quite a few accidents. I wonder if the fatalities and injuries and property damage aren't just the price we must pay for automotive transportation.

MR. SIMPSON: Most certainly not! Automotive transportation of itself is not to blame; the traffic casualties are the result of a variety of factors, some "human" and some "mechanical."

"MR. CITIZEN": Well, automobiles being what they are, and drivers being of

Photographs by courtesy of the General Electric Company

LIGHTING INSTALLATION AT THE INTERSECTION OF CEDAR ROAD AND EUCLID HEIGHTS BOULEVARD, CLEVELAND HEIGHTS, OHIO

GENERAL ILLUMINATION ENGINEERING CO.

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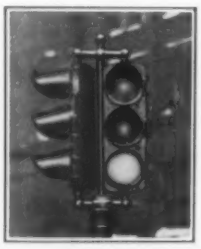

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such a variety of intelligence and temperament and skill, do you think we can do anything about it?

MR. SIMPSON: Yes, I am positive that we can make a very substantial reduction in our traffic accidents—and in the attendant costs paid by you and by me and by all of us.

"MR. CITIZEN": How does that apply to me? I have driven more than 100,000 miles, and with the exception of a few minor scratches I haven't figured in your lists.

MR. SIMPSON: What you mean is that so far you haven't felt the effects in damages or in physical suffering. Although your good record must be commended, you have not escaped your share of the bill for accidents.

"MR. CITIZEN": My credit must be good; no one has collected from me yet.

MR. SIMPSON: No—you mean that "what you don't know doesn't hurt you." As a matter of fact, the average traffic accident bill per family of four is about $88 a year, and the chances are you have paid at least that much, and probably more.

"MR. CITIZEN": Perhaps you're right—insurance people usually are when it comes to figures—but suppose you itemize my bill for me.

MR. SIMPSON: Very well, let us do a little mental arithmetic. First, you will recall the premium you pay each year for your automobile liability insurance.

"MR. CITIZEN": Just a minute. I happen to carry liability insurance, but considering that most motorists do not, I question the connection between it and the cost of traffic accidents.

MR. SIMPSON: The connection is there, nevertheless. With more than 29,000 people killed and almost a million injured in 1933, a big bill was involved. *And it was paid!* The motorists who paid a share of this in the form of liability insurance premiums took the most systematic method. Those who did not carry insurance and had accidents paid a big premium all at once, or else passed it on to the victim or the community.

"MR. CITIZEN": Well, I suppose that's a fair way of looking at it.

MR. SIMPSON: All right, now to your liability insurance premium you must add a small but by no means negligible percentage of your general property taxes in figuring your annual "accident bill."

"MR. CITIZEN": Hold on, here. I admit I pay more general property taxes than I like, but those go for general government administration.

MR. SIMPSON: Just remember that "general government administration" includes such items as municipal medical care of traffic accident cases, and the financing of the police department and the civil courts. In all municipalities one of the principal functions of the police department is traffic control, which has the underlying objective of reducing traffic accidents. As to our civil courts, you know that a large proportion of the damage suits are a result of traffic accidents, and the public pays a big slice of the court costs. These items, and usually others, must be entered as indirect charges you pay in taxes on account of traffic accidents.

THE LIGHTING OF MAYFIELD ROAD, CLEVELAND HEIGHTS, OHIO

"MR. CITIZEN": But suppose I rent a house instead of owning one?

MR. SIMPSON: In that event the landlord simply pays this bill with your money.

Now I am going to ask you to add in one more item. And it is a large one—part of your life insurance and personal accident insurance premiums! You will appreciate that these base insurance rates were calculated before the automobile had become such a destructive weapon. I don't believe I am divulging a "trade secret" when I tell you that if traffic casualties continue to increase, there must be a definite upward revision of the base rates of life insurance and personal accident insurance. Already this traffic hazard has meant an appreciable increase in the net cost of such insurance, through the reduction of dividends you would otherwise have received.

"MR. CITIZEN": Are traffic fatalities becoming a really significant factor in the cost of life insurance and personal accident insurance?

MR. SIMPSON: To cite just one example, I have in mind a large New England company writing nothing but life insurance. In two of the last 24 months over 60 per cent of the life claims paid by this company represented traffic fatalities. They were exceptional months, admittedly, but it takes very few "exceptional" months like those to affect materially the year's mortality experience.

"MR. CITIZEN": That sounds reasonable, and it certainly offers food for thought.

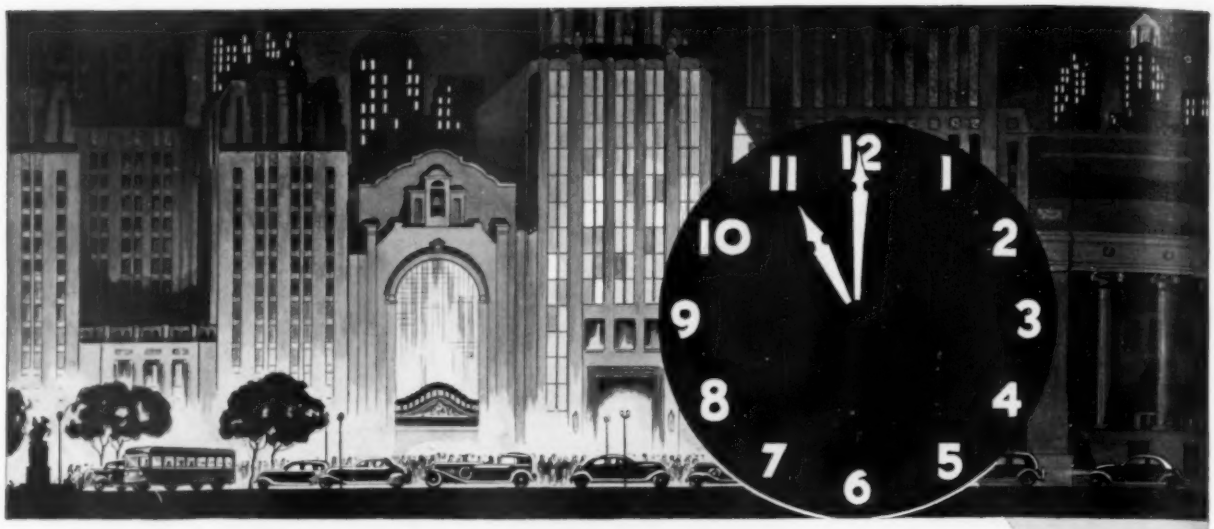
MR. SIMPSON: By the way, have you listed enough items to bring your annual traffic accident bill to the $88 I mentioned?

"MR. CITIZEN": Enough and to spare! I'm beginning to wonder whether the officials in this town are as active as they ought to be in promoting traffic safety measures. What can be done to lessen the hazard?

MR. SIMPSON: It isn't easy to give you a brief answer to that question, and there might be some difference of opinion on it, but certainly *the first requirement is education.* Motorists must be taught how to drive—safely. Pedestrians must be taught how to cross streets—safely. This educational program is already well under way in schools, and it is most encouraging to find that accidents involving school children are decreasing steadily. It's the older people, who ought to know better, that are causing the accidents. Take yourself, for instance. You have a fine safety record, and yet I wonder if you don't take chances when you are in a hurry or preoccupied which you just wouldn't take if you practiced your best normal driving behavior at all times. How about it?

"MR. CITIZEN": Judge, I'm human. But I do see the point and I'll try to keep the safety requirements in mind all the time when I'm driving, and when I'm a pedestrian, too.

MR. SIMPSON: Fine. Now we're ready for *the second safety requirement,* which I believe is *a uniform set of adequate traffic regulations.* To the "safe" driver and pedestrian these regulations are not restrictions of personal liberty or initia-



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tive; they are a code of instructions prepared by recognized experts to assist him in deciding what he should do to fulfill his safety obligations under various conditions.

"MR. CITIZEN": That's a point of view which, frankly, hadn't occurred to me. I think people would pay more attention to traffic regulations if they thought of them in that light.

MR. SIMPSON: *The third safety requirement,* I think, is *enforcement*—prompt and thorough enforcement—of traffic regulations in all instances where recklessness or irresponsibility enters in. There is no other way to make some people recognize their safety obligations to themselves and to others.

"MR. CITIZEN": No argument there.

MR. SIMPSON: Now, while the human element is the most important in all safety matters, we must not neglect the mechanical element. A car cannot be operated safely unless it is in good mechanical condition. My *fourth safety requirement is that every car should have periodic inspections* of such things as brakes, lights, horn, tires, wheel alignment, etc., at a qualified service station. In some states these periodic inspections are required; in some they are available if the motorist wishes to make use of them. Other states will, I believe, soon follow this lead.

"MR. CITIZEN": Yes, those periodic inspections are well worth while.

MR. SIMPSON: Under this heading of "mechanical element," the trend in certain major items of road design—such as clover-leafs, traffic circles, and divided roadways—has the objective of greater safety. Permanently marked traffic lanes and highway sidewalks are safety developments. The legibility and attention-compelling value of stop and warning signs, both by day and by night, is being given careful study. The safety aspect of light-colored pavements, offering better visibility by night, is beginning to be recognized. I could list many other things, but these are representative.

"MR. CITIZEN": Speaking of night visibility, except where the street lighting is pretty good, I don't seem to see well enough to feel very safe when I drive after dark.

MR. SIMPSON: You are not alone in that feeling, and there is good reason why you should be especially careful at night. The human eye acts like a camera. Where the light is good, the eye takes "visual snapshots"—quickly and clearly. But where the light is poor, the eye must take "time exposures," or else the picture is blurred and indistinct. The net result of this reduced "seeing ability" is that the traffic hazard by night in the average municipality is about double that by day. In individual municipalities, of course, this ratio is altered materially by the caliber of the street lighting. Which brings me to *safety requirement No. 5—streets should be adequately lighted.*

"MR. CITIZEN": Yes, but that runs into money. If you are faced with such possibilities as defaulted bonds or unpaid city employees, you can't do much about street lighting, can you?

MR. SIMPSON: Oh, you "do" something about street lighting in any event. You simply have more accidents if the street lighting is neglected, and more crimes, and less business, and lowered property values. Our economic studies have shown without question that reductions in street lighting do not net the public any saving. *The point is you pay for good street lighting whether you have it or not!* In fact, if the street lighting is poor, you usually pay the price of good street lighting about three times over, through increased traffic accidents and crime.

"MR. CITIZEN": How do you figure the economic loss from these preventable night accidents?

MR. SIMPSON: The calculations are based upon the actual cost to the insurance companies of handling liability and damage claims. If anything, our figures are too low, because they place no humanitarian or sentimental value on a fatality or an injury.

"MR. CITIZEN": Perhaps our street lighting is better than it really needs to be to meet the requirements of public safety. How can we tell?

MR. SIMPSON: The Illuminating Engineering Society has prepared a Code of Street Lighting which defines the minimum illumination required for safety on the various classes of streets. You can very easily check your street-lighting system against the Code. Most municipalities, by the way, have only about half as much street illumination as they should have to meet the safety requirements—that is, to represent the lowest over-all expense to the public!

MAYOR CAIN: Thank you, Mr. Simpson, for your most constructive discussion. If I may resume my official capacity, I should like to comment on the street lighting in Cleveland Heights. I believe it conforms rather closely to the Code. All the lighting units are of modern efficient construction, including refractors, and are suspended on brackets well out over the street surface with a mounting height of 20 feet or more. The glassware is washed thoroughly at least four times a year, and the lamps are replaced periodically. On the thoroughfares the lamps are of the 10,000- lumen (1,000 candlepower) size, and on the residence streets the 4,000-lumen (400 candlepower) size is the smallest we use.

I mentioned before that *public safety is the first responsibility of a municipal government. In meeting that responsibility adequate street illumination is just as important as adequate police and fire protection. We have made no reductions in our street-lighting service.*

MR. SIMPSON: You are to be complimented. The hours of darkness, with their low visibility, represent the only great natural hazard for traffic. *If we improve our motoring manners generally, and let the other fellow beat us occasionally, and light out streets adequately, we shall make progress—a great deal of progress—toward traffic safety.*

The Blindness of the "Lights Out!" Order

"LIGHTS OUT!" is a frequent order in cities at present, since reduction of street-lighting service seems an easy way to economize, says the Public Administration Clearing House in a recent bulletin. Cleveland and Canton, Ohio, Yonkers, N. Y., and Lowell and Worcester, Mass., are among the municipalities cutting down on street illumination to make savings.

The New Jersey League of Municipalities, finding retrenchment in street-lighting service common among cities of that state, has taken steps to guard against too great use of this economy measure. A Committee on Street and Highway Lighting and Safety has been appointed to study the situation throughout the state, so that standards of adequate lighting may be established.

According to the current issue of the League magazine, the Committee has laid out its work as follows:

1. To determine how much lighting is necessary to permit safe use of streets and highways at night and how effective lighting can be most economically applied and kept up.

2. To gather data on the economic and humanitarian value of street and highway lighting from the standpoints of the safety of highway users, the safety of pedestrians from robbery and attack, and the safety of householders from burglary. The part of street lighting in the convenience and attractiveness of the streets at night will also be observed.

3. To inform municipalities how their lighting service can be improved for safety and convenience.

Street-lighting engineers, traffic and highway officials serve on the committee of eight. An advisory council is composed of illuminating engineers of utilities and safety engineers of automobile clubs, insurance companies and safety councils.

When the city of Detroit several years ago curtailed its street lighting for the sake of economy, fatal traffic accidents by night increased approximately 70 per cent.

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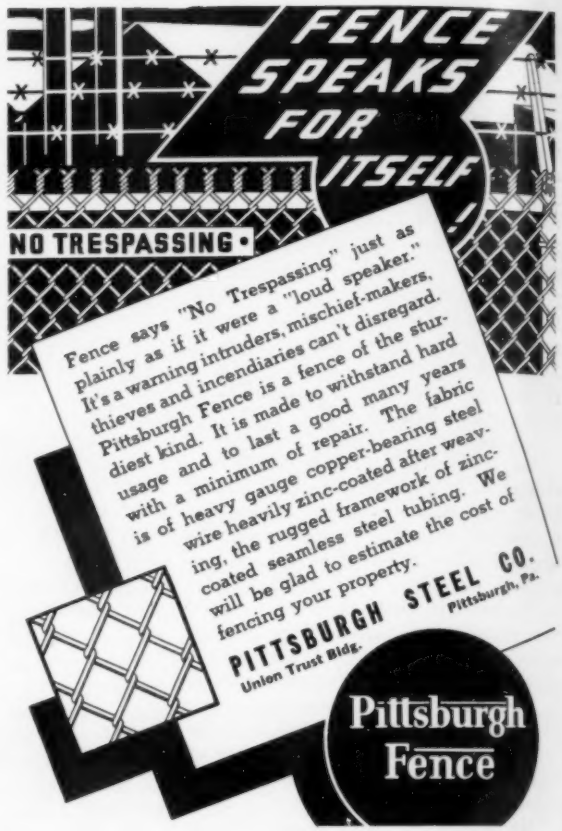
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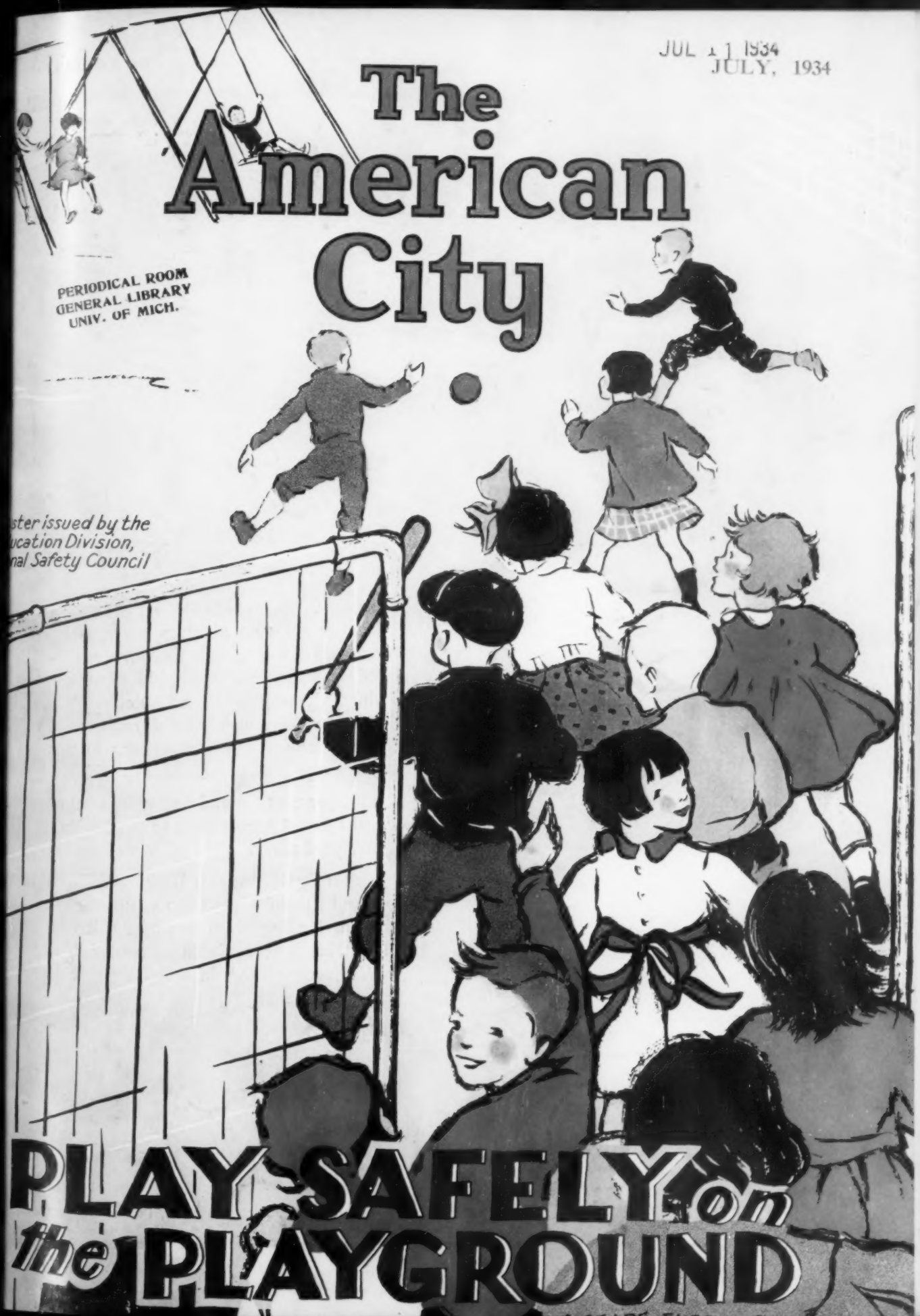

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